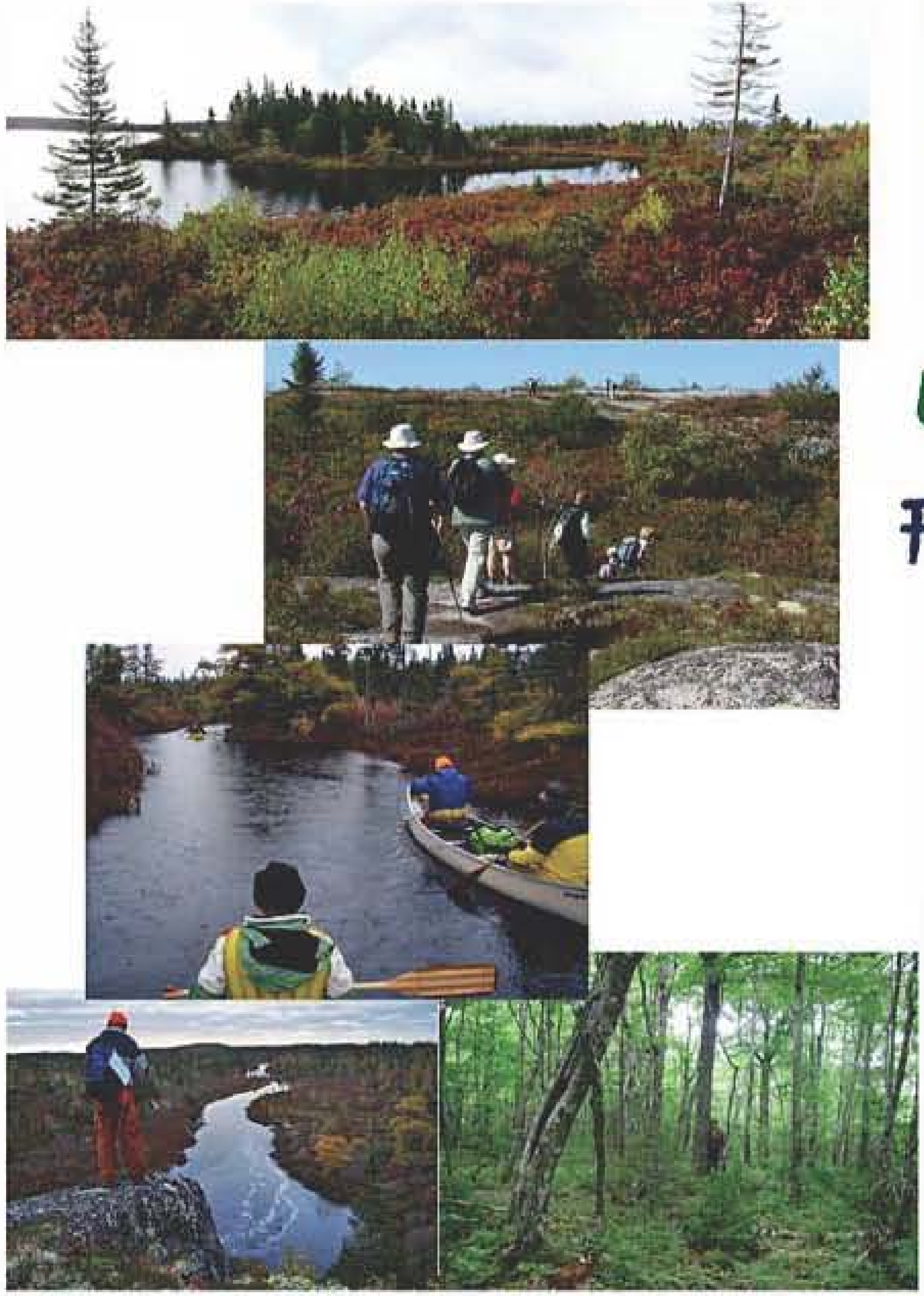

Landscapes of the Five Bridge Lakes Wilderness Area

A Natural History

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blufftrail.ca/wrweo.ca fivebridgestrust.ca

Landscapes of the Five Bridge Lakes Wilderness Area

When we enter the Five Bridge Lakes Wilderness Area (FBLWA) , perhaps via the Bluff Trail or the Old St. Margarets's Bay Road, or paddling a lake, we encounter a varied landscape of lakes, streams, rivers, drumlins, erratics, mixed, deciduous and coniferous forest, bushland, rocky barrens, swamps, fens and bogs. The description of this landscape and the interpretation of "how it came to be" is the business of "natural history". This set of web pages provides a brief overview of the natural history of landscapes of the FBLWA.

The Five Bridge Lakes Wilderness Area lies about 20 kilometers west of downtown Halifax, Nova Scotia. It encompasses almost 10,000 hectares of Crown land located in the centre of the Chebucto Peninsula between highways 103 and 333. Efforts have been made since the mid-1990's to protect parts or all of the crown lands in the FBLWA. These efforts came to fruition in October of 2009, when the Minister of Environment for Nova Scotia declared the Five Bridge Lakes Wilderness Area to be a Candidate Wilderness Area under the Nova Scotia's Wilderness Protection Act. The final designation occured in October of 2011.

The photographs and diagrams in these pages were assembled for a presentation at the AGM of the Woodens River Watershed Environmental Organization in February of 2010.

I thank Richmond Campbell, Ralph Weadon, Beth McGee, Nick Hill and Dr. Ian Spooner at Acadia University for contributing in various ways to my understanding and appreciation of the Five Bridge Lakes Wilderness Area. Any errors are mine.

- David Patriquin

Use of the Materials :

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The Five Bridge Lake Wilderness Area is a horseshoe-shaped area in the centre of the Chebucto Peninsula. For orientation, here are some reference points:

- **Hubley Big Lake** in the northwest shoulder
- **Frederick & Cranberry Lakes** and the trail head for The Bluff Trail towards the northeast;
- **Big Five Bridge Lake** in the armpit, if you will;
- **the Trout Ponds** (Upper and Lower) in the southwest arm ;
- **lakes of the Nine Mile River & Prospect River systems** in the southeast arm.

Halifax Regional Municipality (HRM) owns most of the land within the horseshoe which, we expect, will eventually be included in the FBLWA.

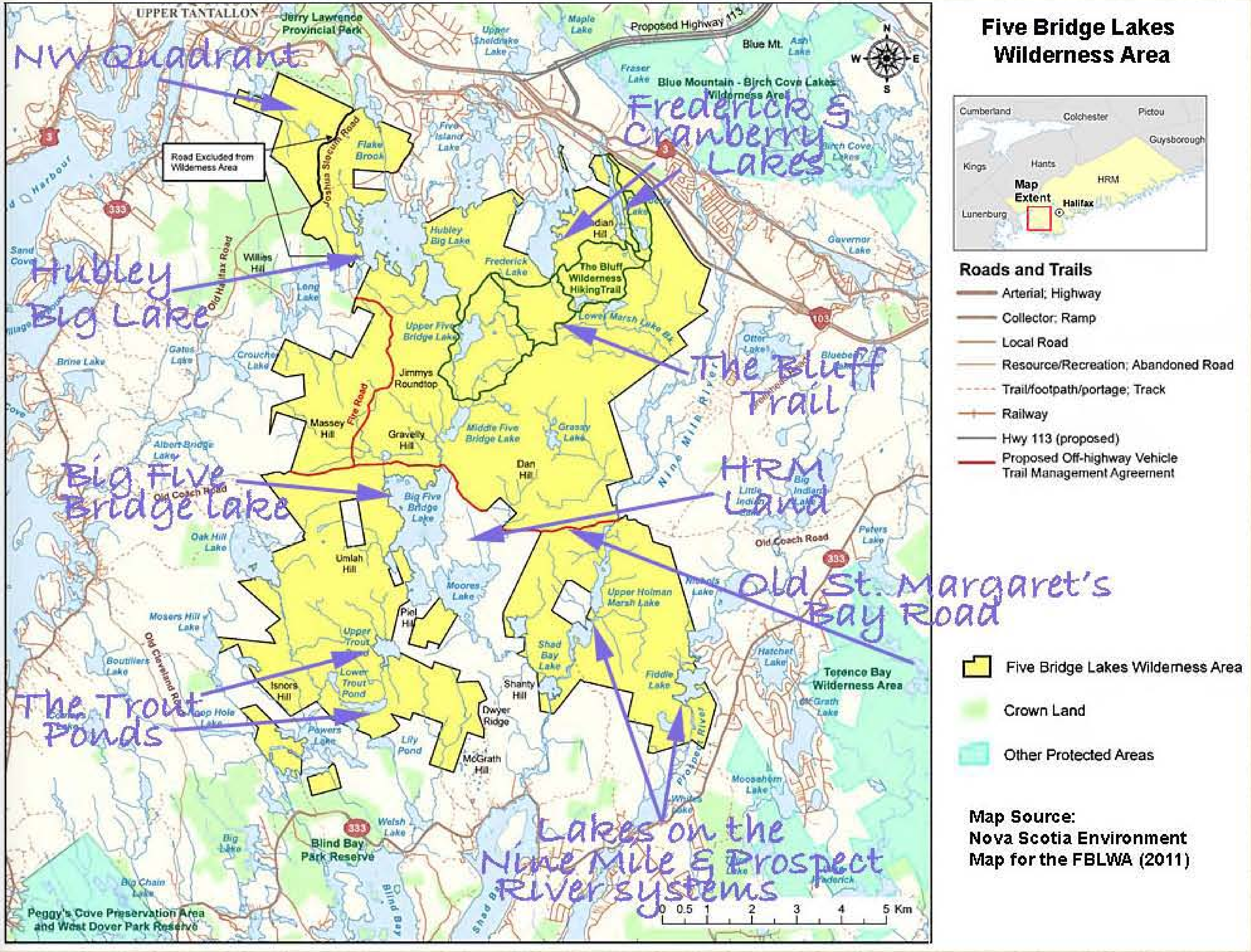
The major trails are:

- the four loops of **The Bluff Wilderness Hiking Trail** towards the northeast ;
- the **Old St. Margaret's Bay Road** (labelled Old Coach Road on the NSE map) cutting across the horseshoe;
- the **Fire Road** which provides access to the Old St. Margaret's Bay Road from the northwest. (Ralph Wheadon told us it was built with "a dozer, some sticks of dynamite and a drill" in 1966.)

These trails are, for the most part, not passable in a vehicle, but the Old St. Margaret's Bay Road and the Fire Road are used by ATVs. (ATVs and bikes are not allowed on The Bluff Trail.)

Five Bridge Wilderness Heritage Trust recently published a walking guide to the Old St. Margaret's Bay Road.

Landscapes of the Five Bridge Lakes Wilderness Area



Key Reference Points on "The Horseshoe"

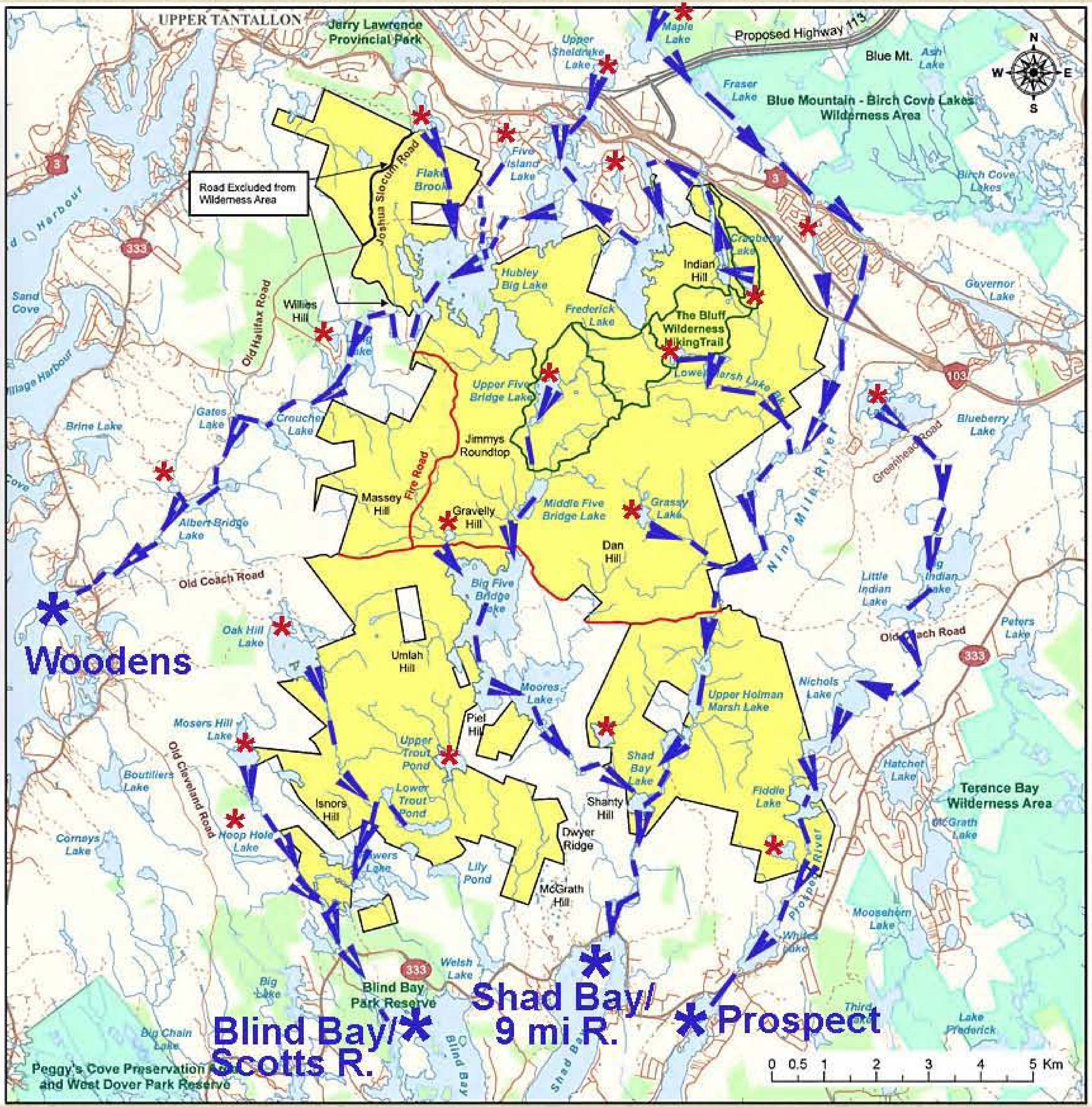
Landscapes of the Five Bridge Lakes Wilderness Area

The Four Major Watersheds

The FBLWA encompasses portions of four major watersheds and includes 26 Lakes, nine of them only partially.

Headwater lakes for the watersheds are marked by red stars. Seven of those lie entirely within the FBLWA, three partially; ten are outside of the FBLWA.

The mouths of the four watersheds lie outside of the FBLWA in coastal areas where there is some settlement. Some of the headwater lakes for the Woodens, Nine Mile River and Propect watersheds lie within settled/industrial areas. Hence critical areas of the watersheds lie outside of the FBLWA and will require other sorts of management to protect water quality, aquatic habitat and movement of migratory fish (eel, gaspereau, some trout, salmon).



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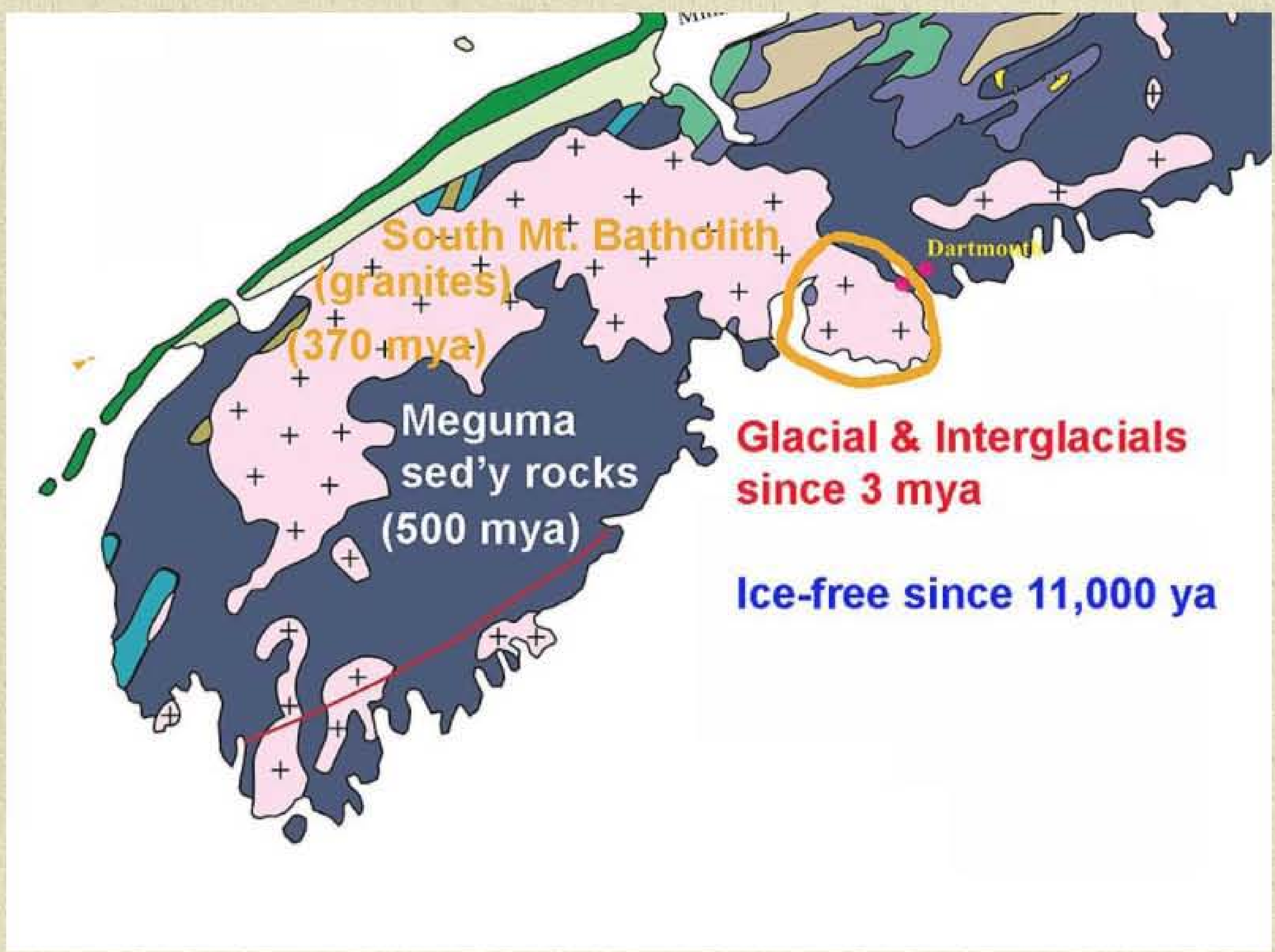
Geologically, most of the Chebucto peninsula is part of the **South Mountain Batholith**. This mass of granitic rock formed 370 million years ago through processes similar to those involved in volcanic eruptions. Molten magma that formed 20-40 km in the earth's crust "boiled up" into the overlying rocks of the Meguma Terrane, but did not reach the surface (as in a volcano); rather it cooled slowly, forming granite.

Glacial action over the last 3 million years (and perhaps during earlier glacial episodes also) cut away the softer overlying, mostly sedimentary rock, exposing the harder rock of the South Mountain Batholith.

The last great ice advance peaked about 18,000 years ago when Nova Scotia as we know it today was completely covered by ice. We have been completely ice-free for about 11,000 years.



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Bedrock Geology

Source of the original figure: **Environmental Geology of Halifax and Surrounds**. EdGEO Field Excursion: Guidebook 20-21 August 2008. Used with permission of the Atlantic Geological Society (March, 2010).

Post-glacial colonization of Nova Scotia by Plants, Animals and Microbes

Post-glacial colonization of Nova Scotia

Following retreat of the ice, plants, animals and microbes colonized Nova Scotia by three major routes:

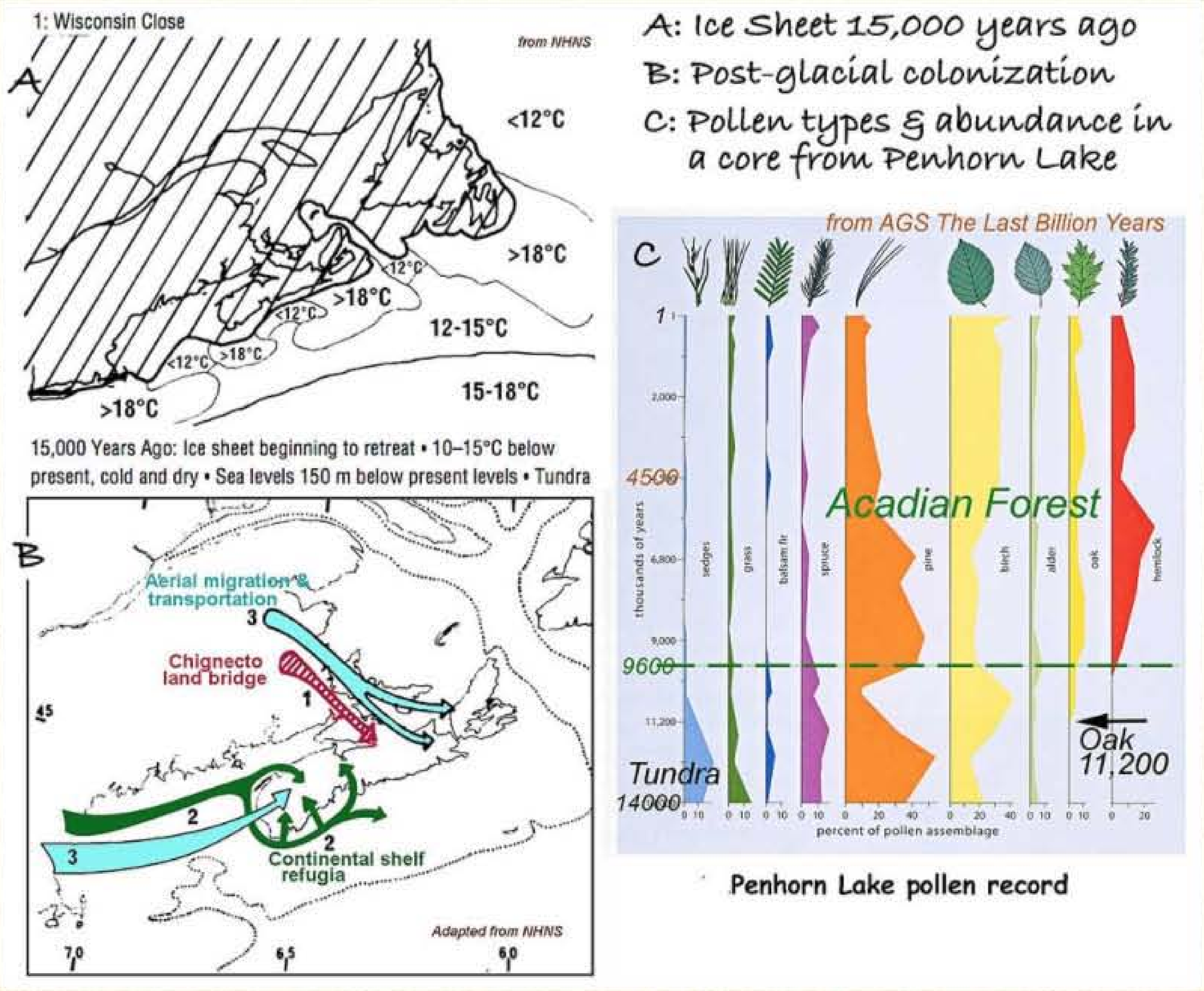
1. via the Chignecto Land Bridge;
2. from Continental Shelf Refugia* and along the coastal plain from the Atlantic states of present day USA;
3. via the air, for some seeds, birds, insects.

Pollen deposited in lake sediments provides a history book of our flora. The figure at right shows the relative abundance of pollen for particular groups of species and some individual species (balsam fir, red oak) in cores from Penhorn Lake in Dartmouth.

A tundra type flora developed quickly. The first occurrence of red oak, about 11,200 ya, marks the beginning of sustained warming (with some ups and downs).

Essentially all major components of our present day Acadian forest were present by 9600 years ago.

*These refugia occurred in an archipelago of islands that existed when sea level wasmuch lower. They are now submerged, except for Sable island. Warmed by the Gulf Stream, these islands appear to have remained ice-free through at least part of the last glaciation. At least that was the prevailing interpretation until recently (Clayden et al. 2010: Vascular flora of the Atlantic Maritime Ecozone: some new perspectives. In Assessment of Species Diversity in the Atlantic Ecozone. *Edited by D.F. McAlpine & I.M. Smith. NRC Research Press, Ottawa, Canada. Pages 197-213*).



A: Ice Sheet 15,000 years ago
B: Post-glacial colonization
C: Pollen types & abundance in a core from Penhorn Lake

15,000 Years Ago: Ice sheet beginning to retreat • 10–15°C below present, cold and dry • Sea levels 150 m below present levels • Tundra

Penhorn Lake pollen record

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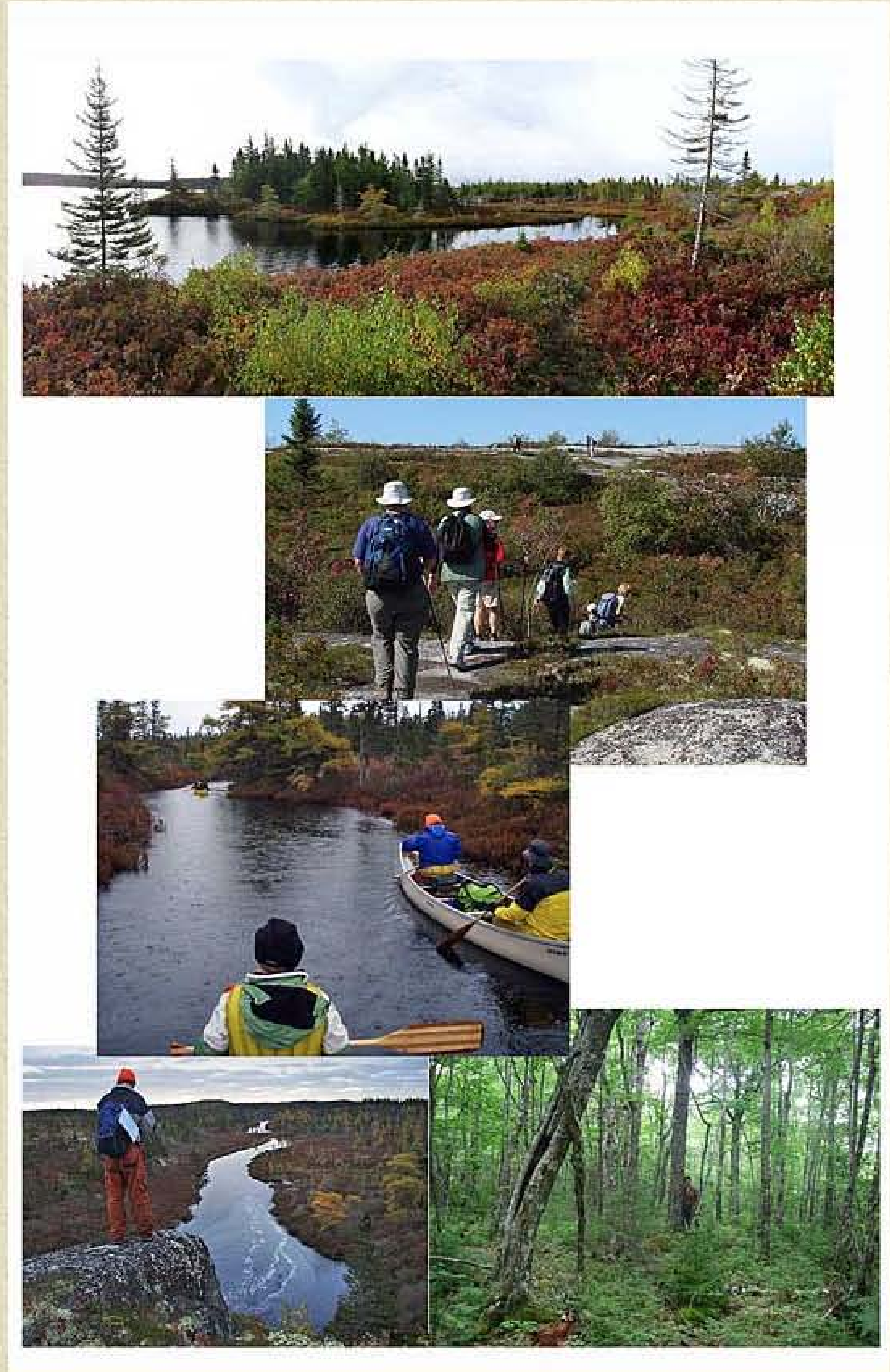
Source of figures: A: *Natural History of Nova Scotia*, Vol 1 (Derek David & Sue Browne, eds,), Nova Socita Museum and Nimbus Publishing, 1997, p. 83; B: modified after Fig. T4.3.1. p 89 of the same publication. Used with permission from Nova Scotia Museum, April 2010. C: The Penhorn Lake Pollen diagram is modified from a figure on p. 189 in *The Last Billion Years. A geological history of the Maritime Provinces of Canada*. (Robert A. Fensome & Graham L. Williams, eds.) Nimbus Publishing, 2001. Used with permission from the Atlantic Geologiaal Society, March 2010.

Landscapes of the Five Bridge Lakes Wilderness Area

Three environmental factors have had especially important influences on the landscapes, habitats, plants and animals that we see today in the Five Bridge Lakes Wilderness Area:

- glacial activity
- the rock type
- recurrent fires



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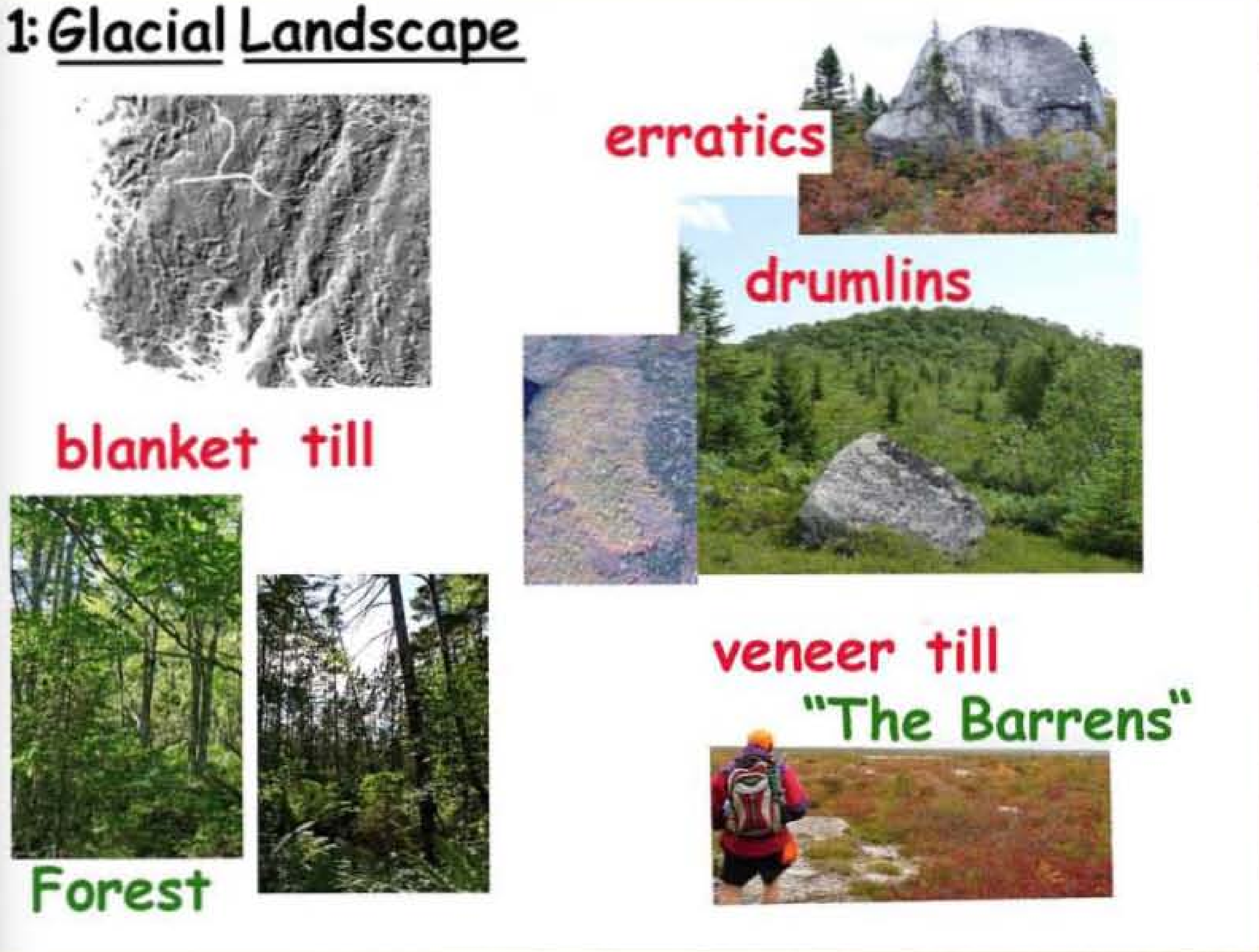
1: Glacial Landscape



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The first factor is the *glacial landscape* in which the FBLWA is situated.

Prominent features of this landscape are

- **ridges and lakes** carved out of the granite; they are often somewhat or highly elongated in the direction of ice flow during a glacial interval;
- **drumlins**;
- large bouders deposited by retreating glaciers; some may be called **erratics** or **perched boulders;**
- areas of **veneer till** which are the so-called **barrens**, occupied mostly by low bushy vegetation or rock faces with only mosses and lichens;
- areas of **blanket till**, which support forests.

GLOSSARY

barren
A community of relatively sparsely distributed plants that cover less than half of the ground area. Barrens often have few trees and are dominated by a single species. The plants are often small and stunted compared to individuals of the same species from less infertile habitats.[1]

drumlin
Elongated, smooth hills of till, gravel and sand created by continental glaciers. The elongation is in the direction of ice flow. Many drumlins are steepest at the ends that face the direction from which the ice came and fall gradually to ground level at the other ends.[2]

erratic
A piece of rock that has been eroded and transported by a glacier to a different area; it is left behind when the ice melts.[3]

perched boulder
A glacial erratic that has been transported by a glacier and rests precariously at a different location then its source.[3]

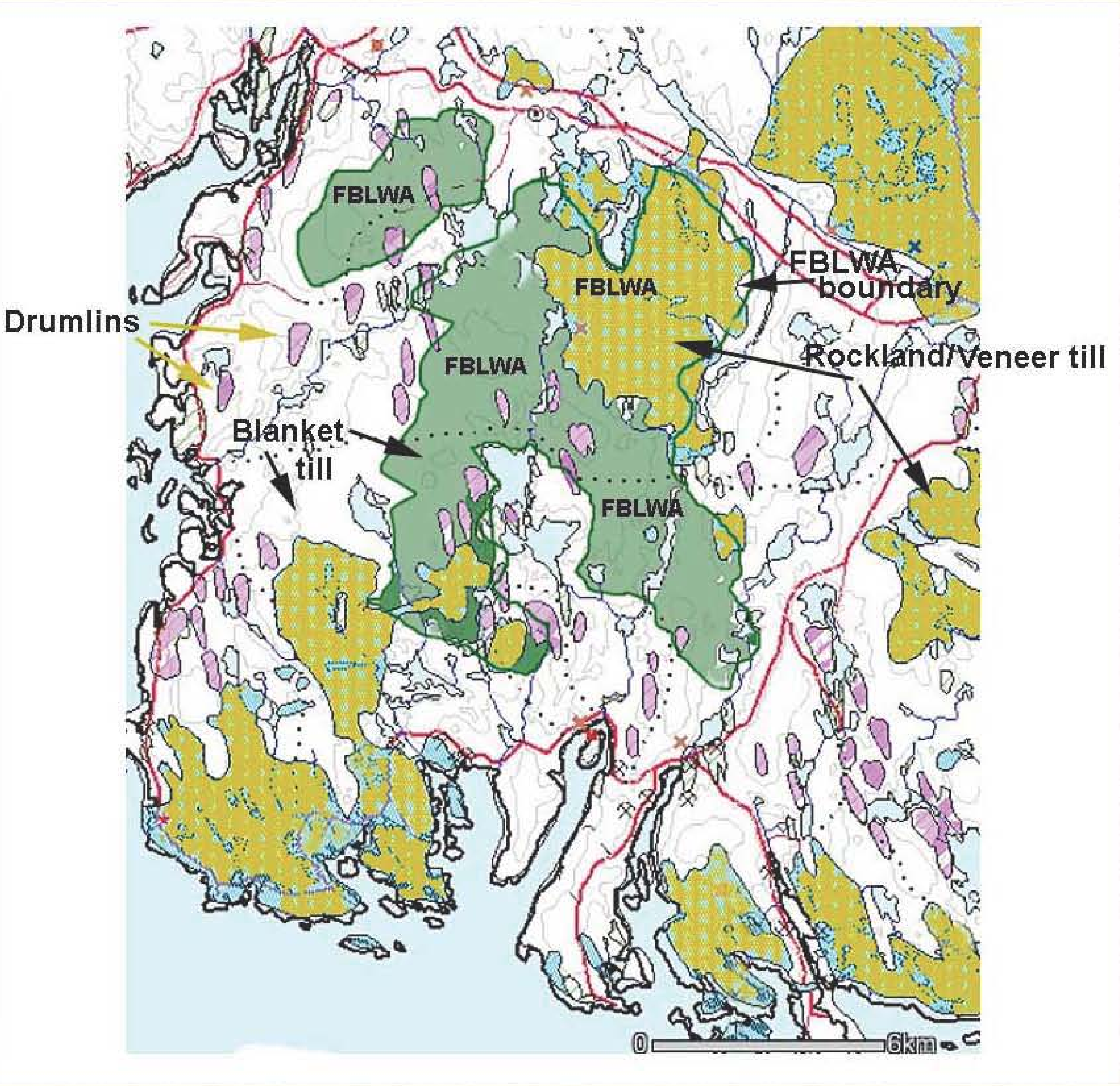
till
The ice of a glacier contains clay, dust, and rock and mineral fragments from silt to boulder size. When a glacier melts away, all this miscellaneous material is deposted as a sediment called till.[2] **Blanket till** refers to thick and continuous till. **Veneer till** refers to thin and discontinuous till; it may inlcude areas of rock outcrop. [4]

1. Bailey, J. *2006. Collins dictionary of botany*. Glascow: Harper-Collins.
2.Roberts, D.C. 1996. *A field guide to geology. Eastern North America*. Peterson Field Guide Series. Boston: Houghton Mifflin Co.
3. Newfoundland and Labrador Natural Resources. *Geological Survey*. http://www.nr.gov.nl.ca/mines&en/geosurvey/education/features/glacial/ Accessed 30 may, 2010.
4. Fulton, R. J. (Compiler), 1996. *Surficial Materials of Canada*, Geological Survey of Canada, Natural Resources Canada. Ottawa. Map 1880A.

This map shows the broad distribution of **veneer till** (referred to as "rockland" on the regional soils map), **blanket till** and **drumlins** in and around the FBLWA.

The FBLWA is shaded green (borders are approximate).

Note the tendency of drumins to be oriented with the long axis pointing towards the south-east, the direction of advance the last great ice sheet in this area.



Distribution of Veneer Till, Blanket Till and Drumlins in and around the FBLWA

The map was constructed from Nova Scotia Department of Natural Resources maps available online.

Landscapes of the Five Bridge Lakes Wilderness Area

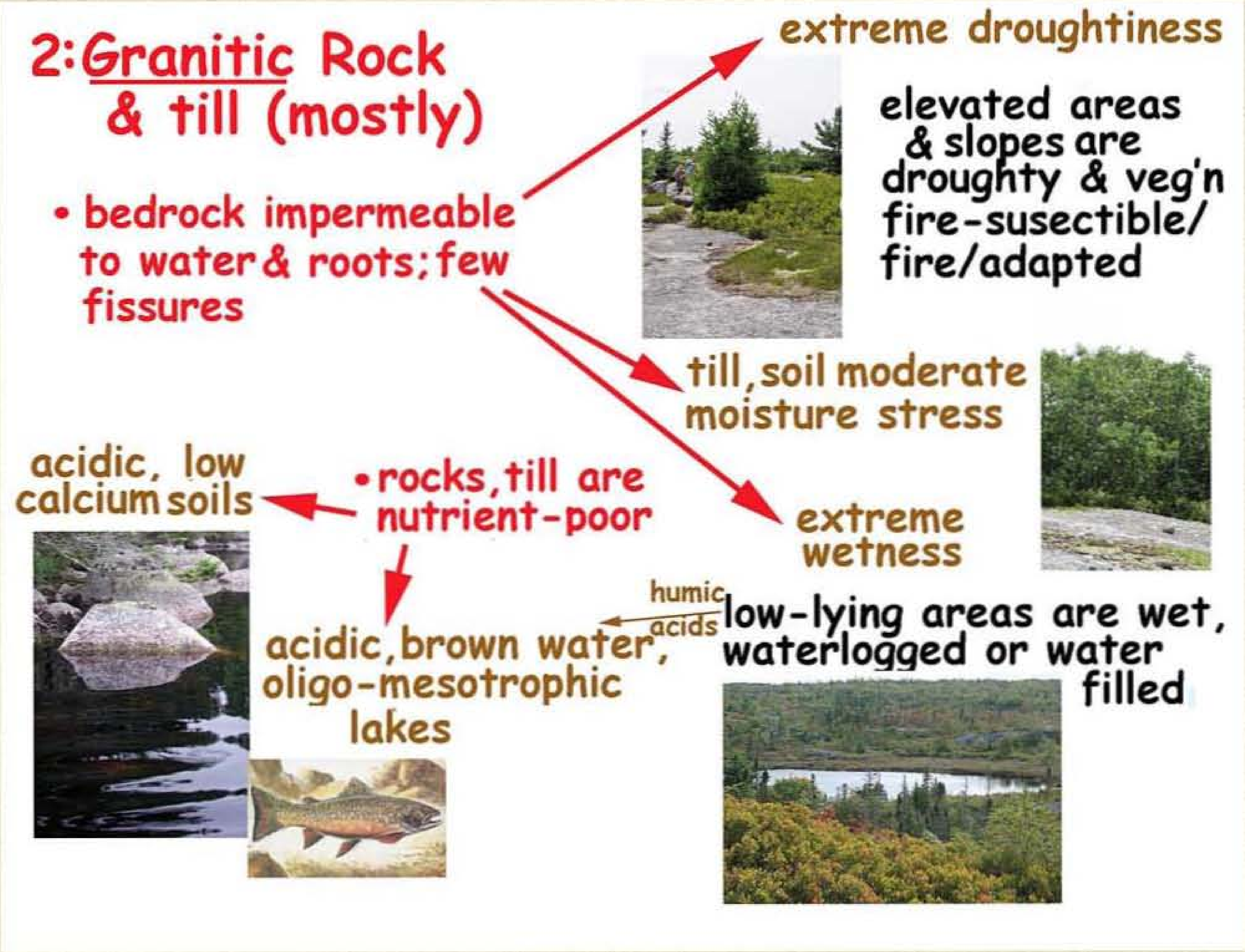
The second environmental factor is the nature of the rock. Granites predominate throughout the FBLWA. This has two major effects on the plant communities:

1. Granitic rock is very hard and impermeable to water and roots, and there are few fissures. This results in extreme droughtiness in elevated areas and on slopes, and in extreme wetness in depressions and low-lying areas.
2. Granitic rock is mineral poor and breaks down very slowly, resulting in acidic, low calcium soils and water.

In the upper lying, well drained areas, slow-growing vegetation tolerant of extreme drying and recurrent fires develops - the so called barrens vegetation. It includes low bushy species species such as bluekberry, huckleberry, and broom crowberry.

In the low-lying areas, vegetation tolerant of extreme wetness and waterlogging and nutrient poor-condiitons develops including bog species such as sphagnum moss and Labrador tea. Humic acids from wetlands and low lying forests leach into water bodies, forming "brown water".

Forest develops only where there is some accumulation of till. In low-lying areas, forests or quasi-forest stands are dominated by red maple, tamarack, or black spruce (othen with fir) according to local conditions. In higher lying areas there may be mixed deciduous-conifer forests or pure hardwoods. Species requiring higher calcium levels, e.g., sugar maple, are not found in these areas.



2: Granitic Rock & till (mostly)

- bedrock impermeable to water & roots; few fissures

extreme droughtiness

elevated areas & slopes are droughty & veg'n fire-susectible/ fire/adapted

till, soil moderate moisture stress

extreme wetness

low-lying areas are wet, waterlogged or water filled

humic acids

acidic, low calcium soils

- rocks, till are nutrient-poor

acidic, brown water, oligo-mesotrophic lakes

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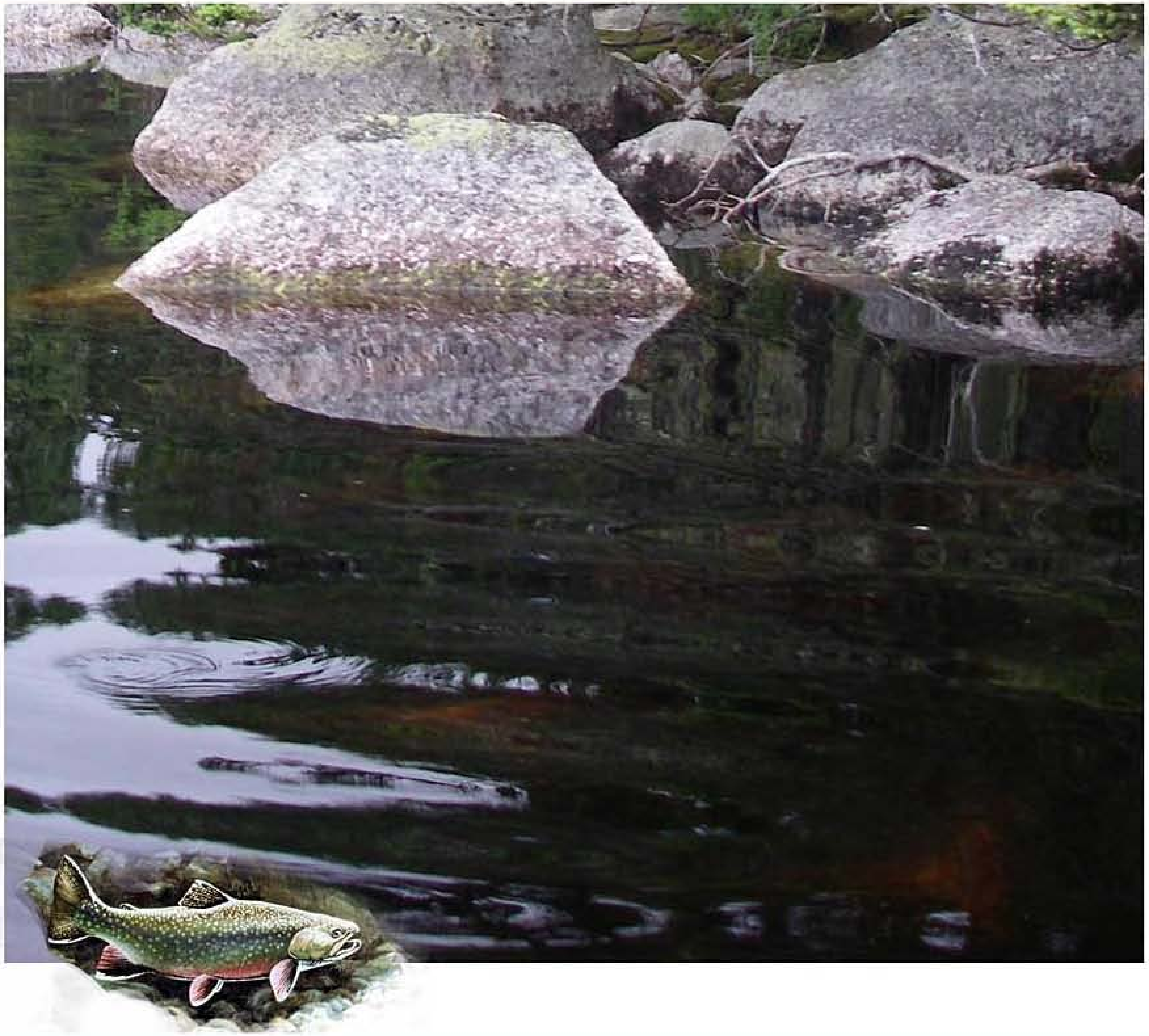
Brown water & brook trout in Lower Trout Lake

Humic acids from wetlands and low lying forests color the water of the FBLWA brown.

This material buffers or lessens, to some extent, the effects of acid rain. Thus it helps to protect brook trout from aluminum toxicity at low pH: brook trout can tolerate a lower pH in brown water than they can tolerate in clear water.

Maintenance of these brown waters is very much dependent on the continued integrity of the land-water systems.

It is likely as well that the brook trout in the FBLWA are genetically adapted to these waters. Thus they can be described as *heritage* brook trout populations.



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The trout insert was derived from artwork by Robert W. Hines available in the **public domain**.

The third environmental factor is **fire**.

Fire is a type of "**ecological disturbance**":

> an event that results in a sustained disruption of an ecosystem's structure and function, generally with effects that last for time periods longer than a single seasonal growing cycle for natural vegetation cover[1]

Disturbances that are severe enough to cause most of the above ground vegetation to be destroyed are called "**stand-replacing disturbances**". Stand-replacing disturbances essentially "reset the clock", initiating new successional sequences.

Recurrent, stand-replacing fires started by lightening, occur naturally in some landscapes. In Canada's boreal forest, for example, such fires occur at intervals of about 250 years on average. For the Acadian forest, which covers much of NS, natural fire intervals are much longer, perhaps 1000 years or more. They occur at shorter intervals on more drought prone landscapes such as barrens, e.g., perhaps at 150-250 year intervals on average.

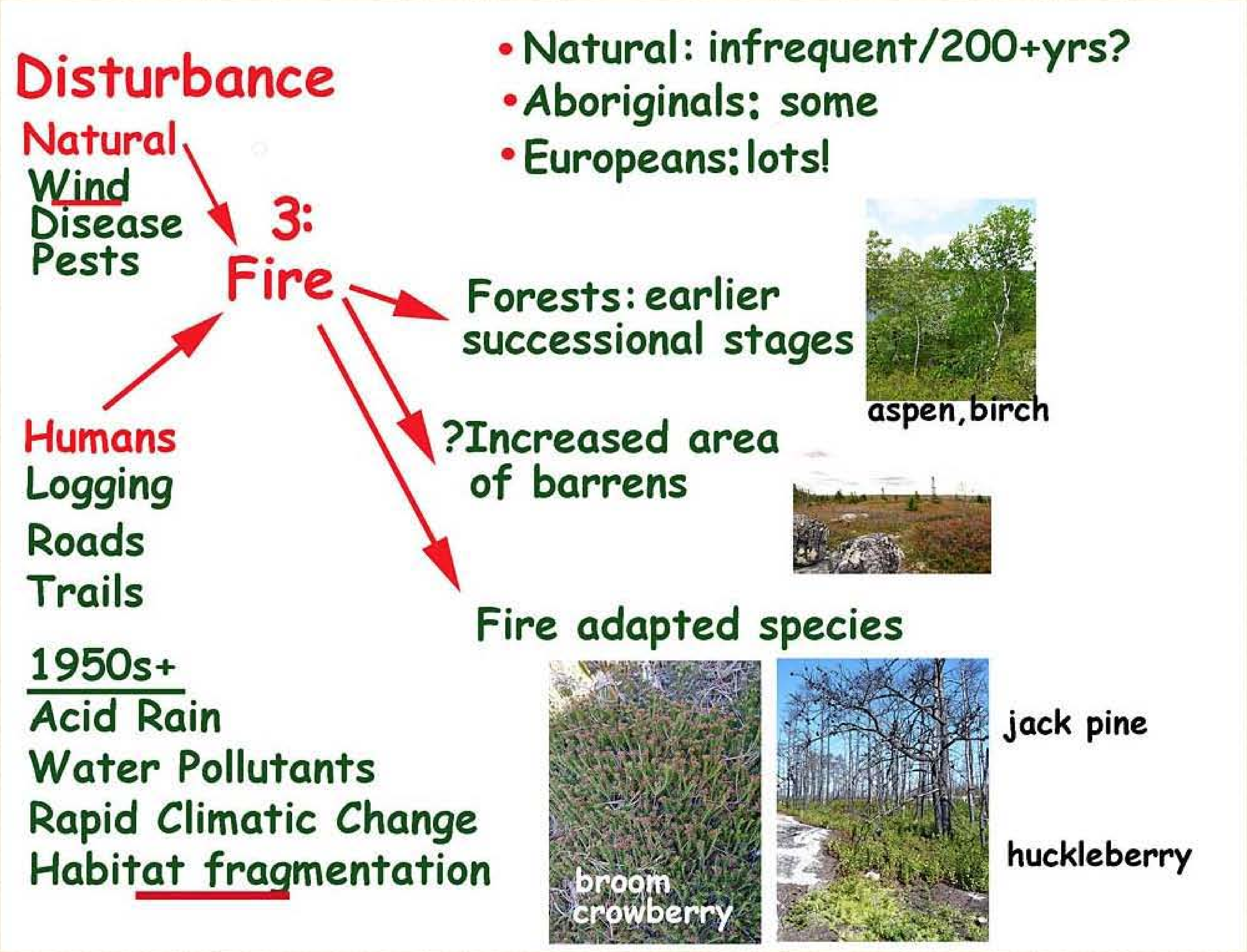
After the Europeans arrived, fires started deliberately or accidentally, occurred at much shorter intervals over much of the Nova Scotian landscape, e.g., 100 years or less, up until recently.

A very large fire occurred on the Chebucto Peninsula in 1957. The last extensive fire on the Chebucto Peninsula occurred in the 1980s, after which malicious setting of fires declined sharply and fire control became more effective.

Naturally occurring pests and diseases and logging have also caused some stand replacements. Today, probably 80% or more of the landscape on the Chebucto Peninsula has been "reset" within the last 30 to 70 years. As a result:

- forests at large tend to be dominated by earlier succesional species and to be even-aged;
- fire adapted species predominate on the most fire-prone landscapes, such as the barrens;
- the area of barrens is likely larger than it was before Europeans arrived (more would have been forested).

Reduced setting of fires and better control of fires has reduced fire disturbances now, but other *human caused disturbances* are increasing and may affect even protected areas in the future.



Disturbance

Natural

Wind

Disease

Pests

3:

Fire

Humans

Logging

Roads

Trails

1950s+

Acid Rain

Water Pollutants

Rapid Climatic Change

Habitat fragmentation

- Natural: infrequent/200+yrs?
- Aboriginals: some
- Europeans: lots!

Forests: earlier successional stages

aspen, birch

?Increased area of barrens

Fire adapted species

broom crowberry

jack pine

huckleberry

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1. Source: NASA-CASA Project

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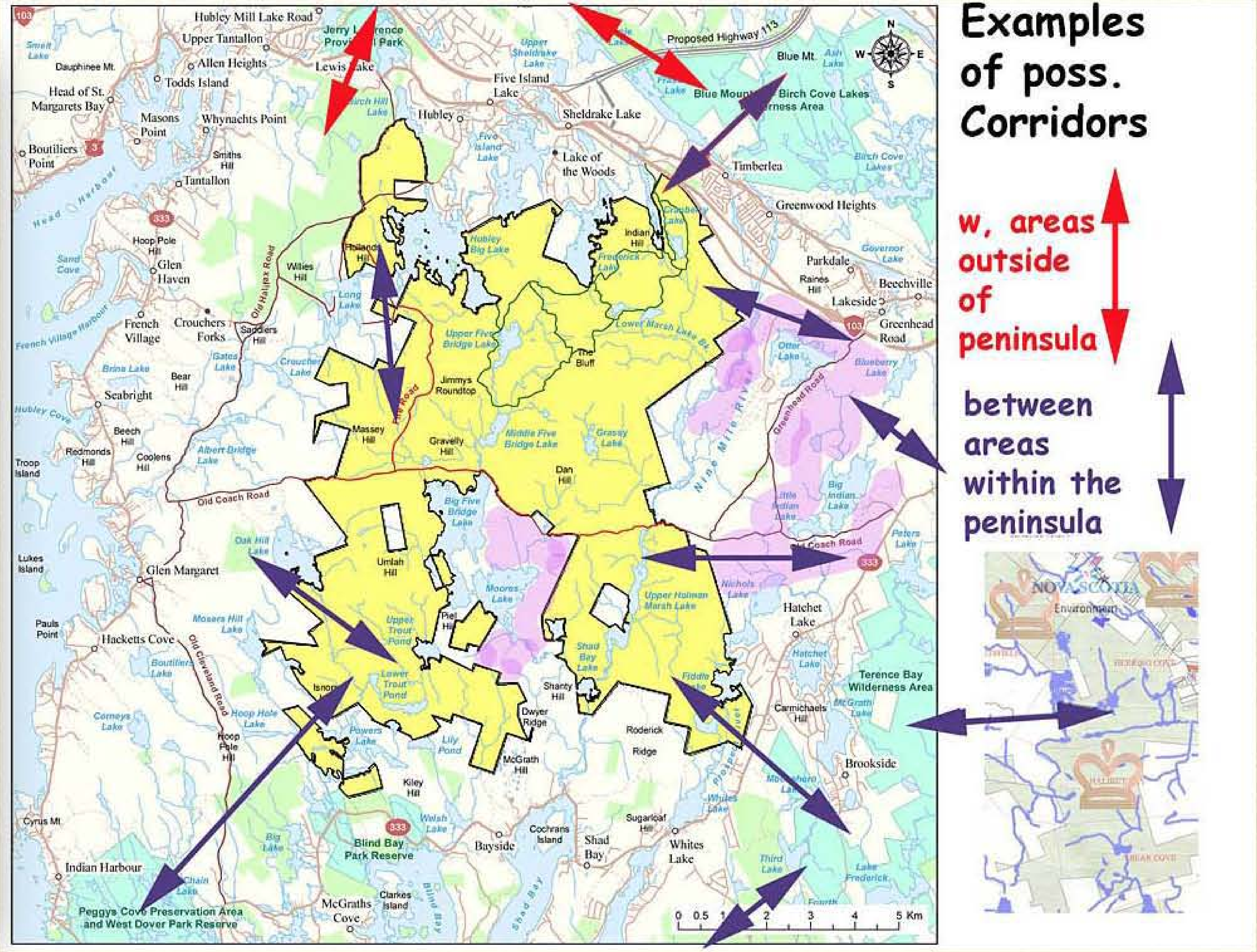
Habitat Fragmentation: the major cause of species loss

Conservation biologists generally agree that the major cause of species extinctions currently and into the near future is habitat fragmentation.

This refers to the breaking up of large, contiguous areas of natural habitat into smaller "islands" of natural habitat within a matrix of human dominated landscape. Such fragmentation reduces the number of wild species the remaining natural areas can support over the long term.

Creating **wildlife corridors** between these islands of natural habitat preserves some of the features of a larger contiguous habitat and reduces species losses. The corridors allow movement of species between the "islands" that otherwise may be inhibited by human-dominated landscape. This movement is essential for gene flow (outbreeding), and to allow re-establishment of a subpopulation that has died off because of some local event such as a fire.

With formal protection of the FBLWA, there will be a lot of wild land protected on the Chebucto Peninsula. However, to maximize the effectiveness of these areas to conserve native biodiversity, we need to establish and protect wildlife corridors between the "islands" of wild land on the Peninusla, and between these wild lands and wildlands on the greater mainland.



Examples of poss. Corridors

w, areas outside of peninsula

between areas within the peninsula

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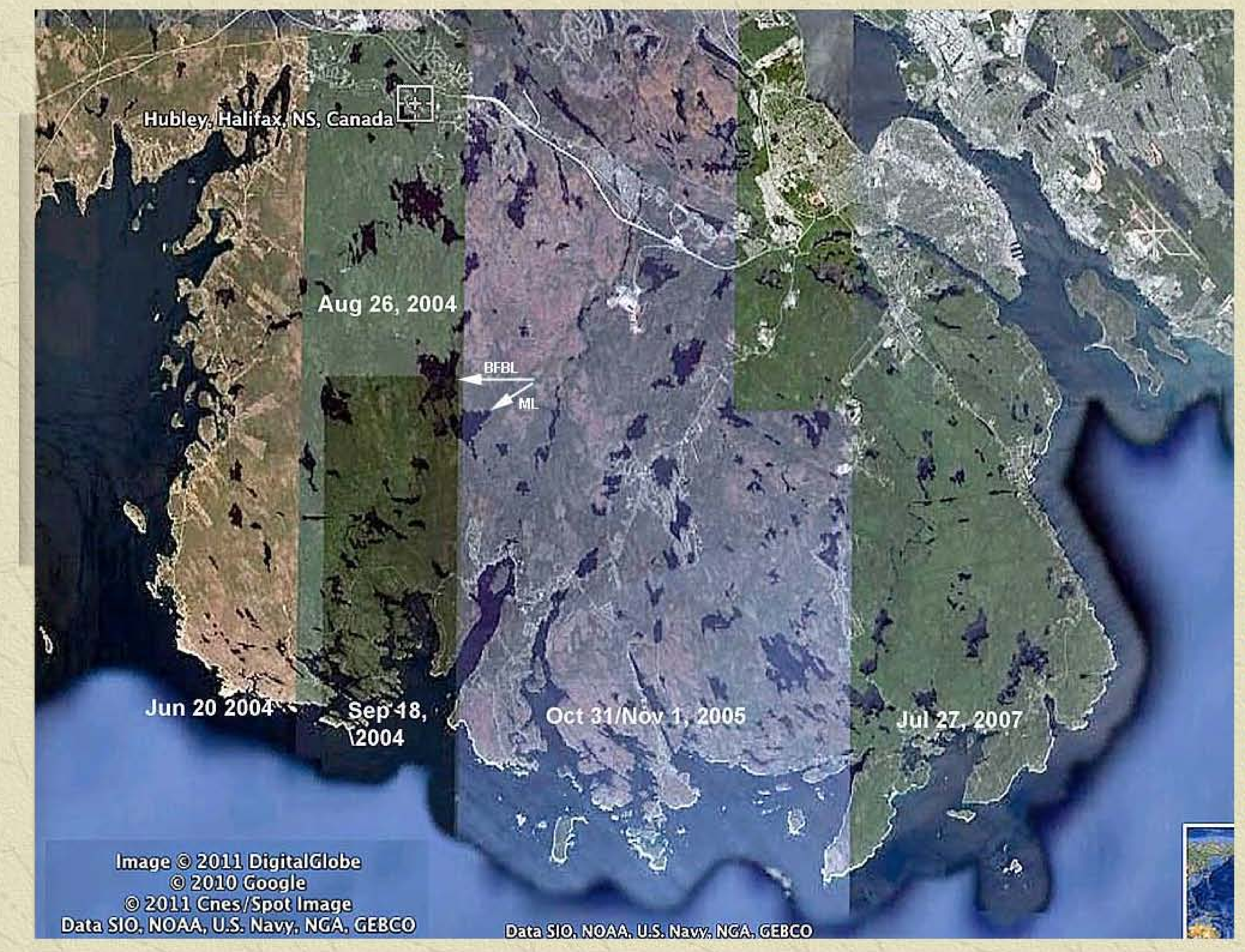
Zooming In: Google Earth View of the Chebucto Peninsula

Now we want to move from general principles to look at specific landscapes and habitats, beginning with a Google Earth image of the Chebucto Peninsula.

For orientation, it's helpful to remember that Big Five Bridge Lake, and Moore's Lake to the southeast of it (BFBL & ML on the Google Map) are located in the "armpit" of the FBLWA.

This image is a composite, made up (by Google) from satellite images obtained on several different years, months and days. In the central strip, recorded on Oct. 31/Nov.1, we can see contrasting reddish and dark green areas, not discernable in other strips. When we zoomed in a bit on this area, it proved to be very informative...


Hubley, Halifax, NS, Canada
Aug 26, 2004
BFBL
ML
Jun 20 2004
Sep 18, 2004
Oct 31/Nov 1, 2005
Jul 27, 2007
Image © 2011 DigitalGlobe
© 2010 Google
© 2011 Cnes/Spot Image
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Landscapes of the Five Bridge Lakes Wilderness Area

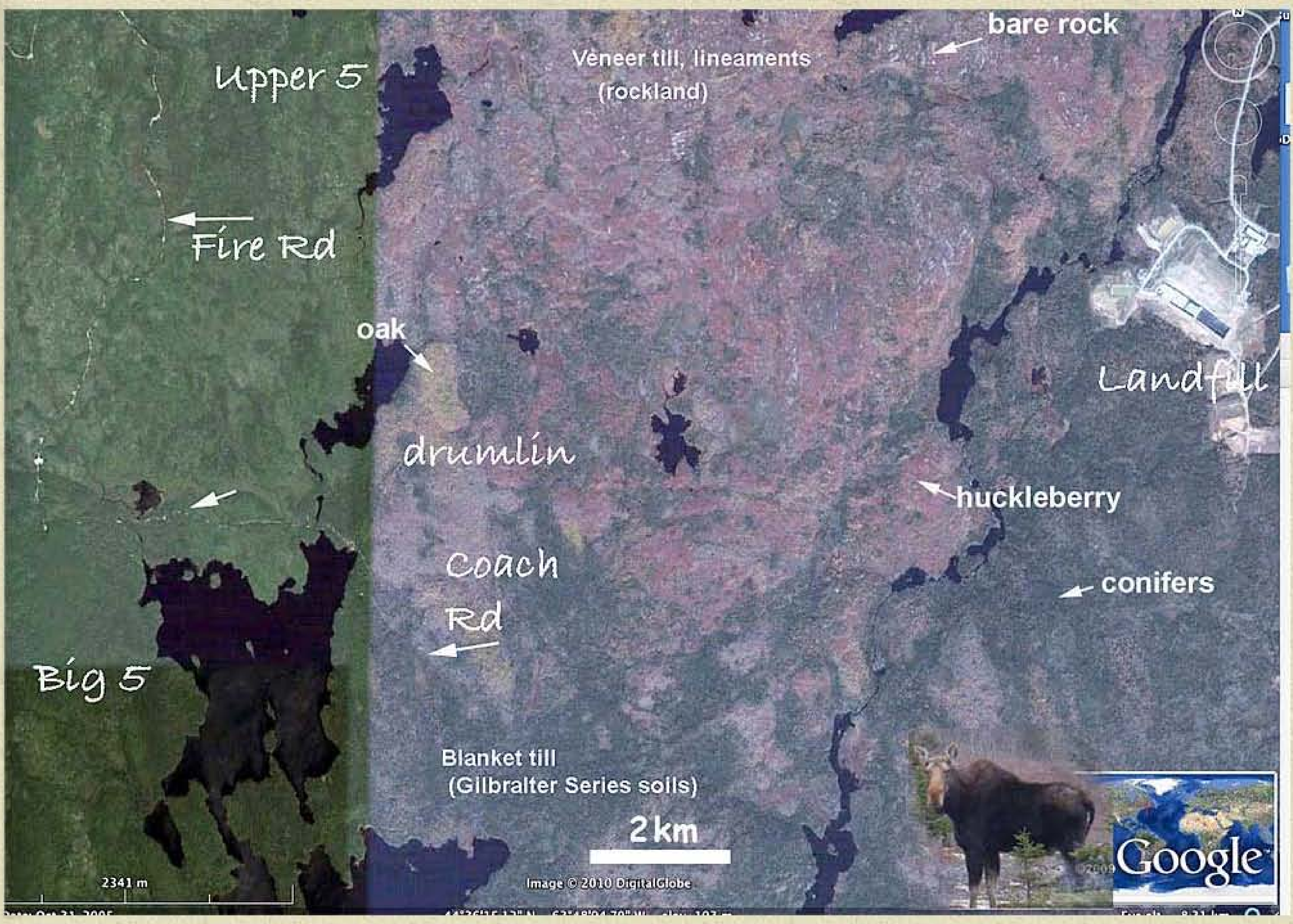
Colour Coded Landscapes

The Oct31/Nov1 (2005) strip is essentially color-coded, the following landscape features standing out:

- The **reddish coloured areas** are barrens, the colour coming from leaves of common huckleberry which are fire-engine red in the mid-to-late fall before they drop.
- **White spots and slivers** within the reddish coloured areas are of bare rock, perhaps with some cover by lichens and mosses, but without a lot of huckleberry.
- The **dark green areas** are forest stands with a lot conifers (principally red spruce, black spruce, pine),
- **Yellowish coloured areas are stands with a lot of red oak.** Red oak retains its leaves late into the fall after leaves of other deciduous trees have dropped. One of these stands outlines very nicely an oblong drumlin oiented towards the southeast.

Somewhat **less well defined, grayish areas**, some with a little bit of dark green or yellow are deciduous or mixed forest that is dominated by species other than oak or conifers, e.g., they might be predominantly red maple, birch or aspen or some combination of those species; some may be areas of wettish "bushland" dominated by species such as mountain holly, rhodora, witherod, but without a lot of huckleberry.

Note that in the lower part of the Oct 31/Nov1 strip, roughly below the Old Coach Road (Old St. Margaret's Bay Road), dark green predominates while in the upper part, reddish hues predominate. These differences correspond to a predominance of barrens above the Old Coach Road and of coniferous and mixed forest below the old St. Margarets Bay Road. However, it is clear that both areas are actually mosaics of different landscapes and vegetation types, which relates to the glacial landscape features discussed previously. Diversified landscapes and vegetation, with few roads or trails, make the FBLWA especially good habitat for the Mainland Moose.



Lineamints: These are "significant lines of landscape caused by joints and faults, revealing the architecture of the rock basement." (Cited in Pothiraj Prabu and Baskaran Rajagopalan (2013). Mapping of Lineaments for Groundwater Targeting and Sustainable Water Resource Management in Hard Rock Hydrogeological Environment Using RS- GIS http://cdn.intechopen.com/pdfs-wm/44481.pdf)

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Closer-up: Vegetation on terrain between Pot Lake and Cranberry Lake.

Pot Lake and Cranberry Lake are shallow, glacially carved lakes, oriented roughly along a NNW-SSE axis. They are separated by a glacially sculpted hill with exposed rock barrens towards the south and are joined by a stream flowing east to west through a low area extending from the northwest side of Pot Lake to the southeast side of Cranberry Lake. Loop 1 of The Bluff trail goes through this area.

The distribution of several vegetation types that can be distinguished on the October 31, 2005 Google Earth image for the area illustrate some of the relationships between vegetation, topography and exposure to the elements.

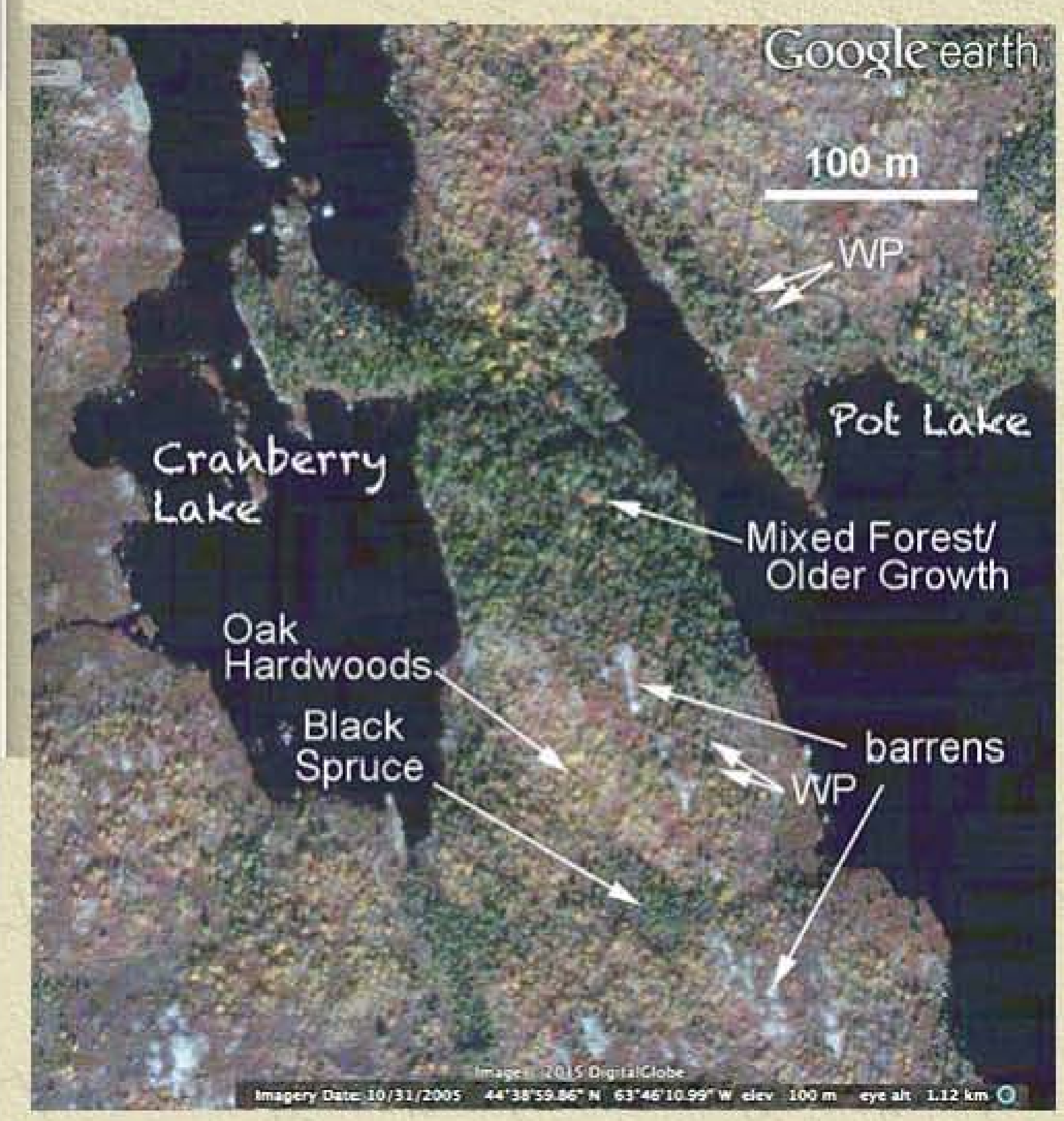
The **open (rock) barrens** show up as whitish patches, with pink around them where the bushy **huckleberry** has enough soil to get a foothold, but is not deep enough for trees. The barrens are areas where the glaciers scraped the rocks surface and any loose materials were washed away. They are typically raised (elevated) above the immediate surroundings.

The yellowish areas are **red oak dominated hardwoods**, typical of quickly drained more exposed, slopes.

Large white pines (WP) occur on drier land adjacent to barrens, rarely forming a closed canopy.

Mixed, older growth forest with large red spruce, fir, red maple and yellow birch occurs where the land slopes down towards the low area and towards each lake. Apparently these rather moist areas were spared during the last fires.

To the south, **black spruce** stands occur on low lying wettish ground.


Google earth
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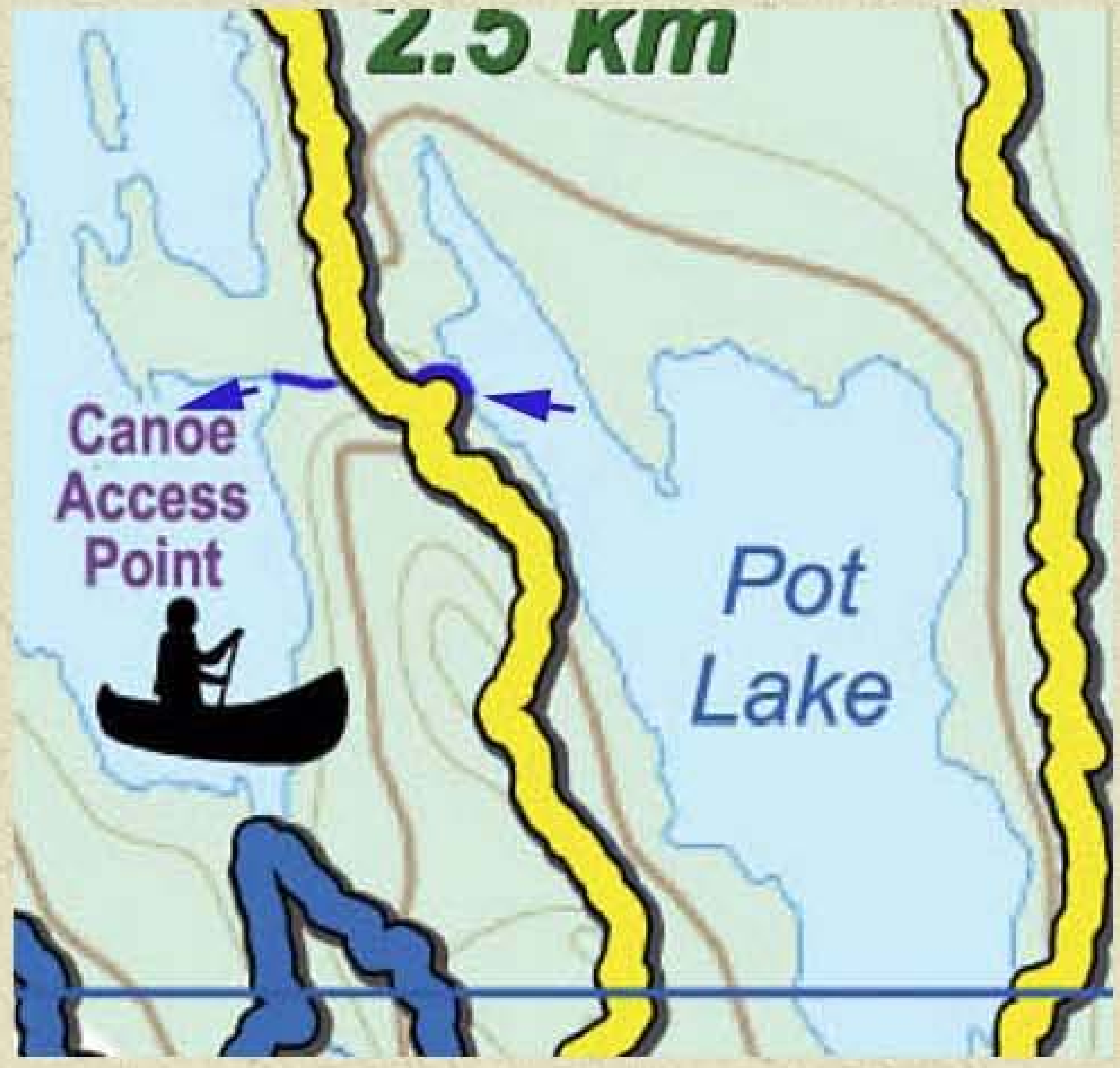
Cranberry Lake
Mixed Forest/ Older Growth
Oak Hardwoods
Black Spruce
barrens
WP
Image © 2015 DigitalGlobe
Imagery Date: 10/31/2005 44°38'59.86" N 63°46'10.99" W elev 100 m eye alt 1.12 km



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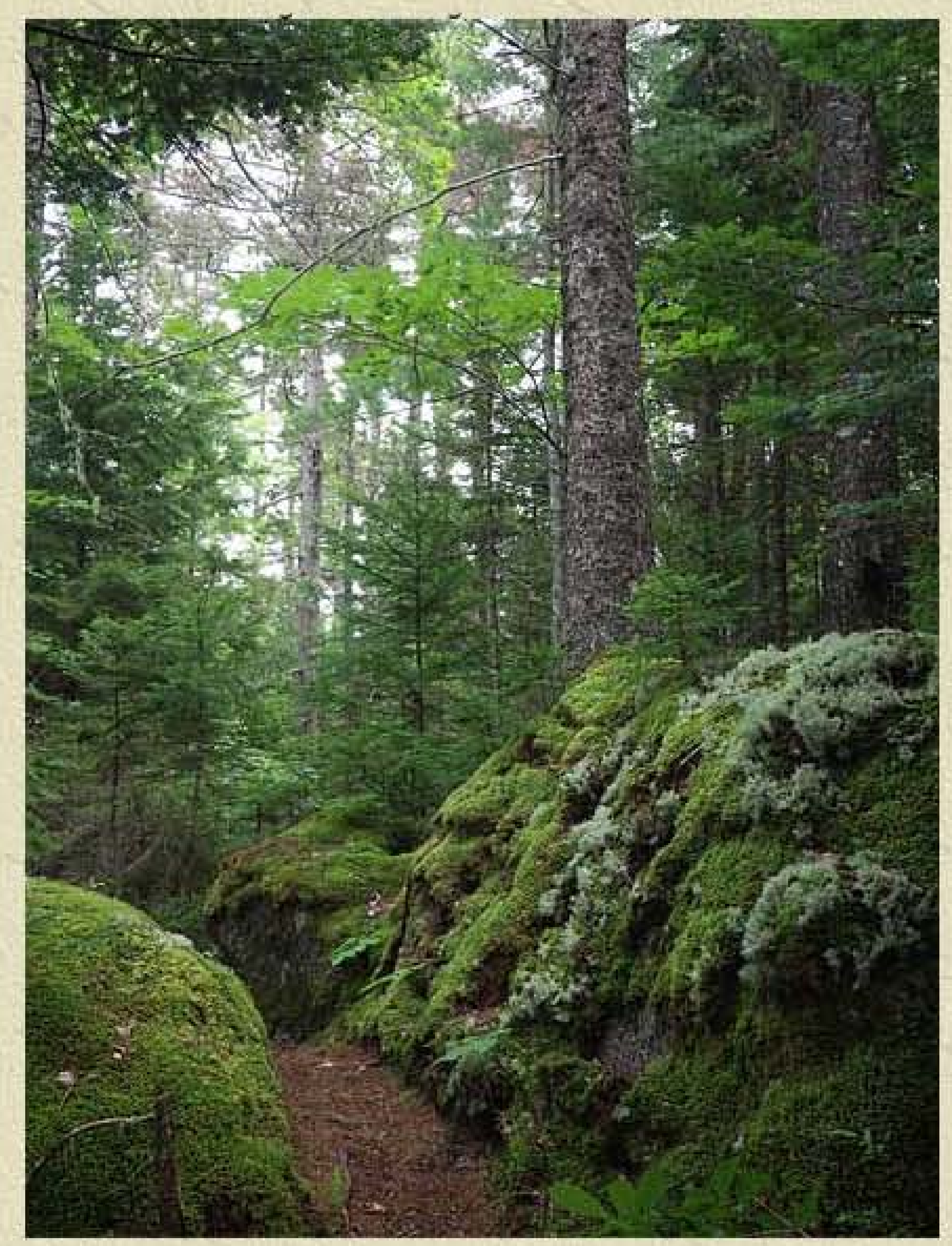
Closer-up: Vegetation on terrain between Pot Lake and Cranberry Lake.

The photo at right and the next two slides are ground views of features distinguishable on Google Maps

At right:Older Growth Mixed Forest with moss and lichen covered forest floor on portage route Pot Lake-Cranberry Lake

Large trees at right are red spruce. Also in photo: red maple, white pine, balsam fir.

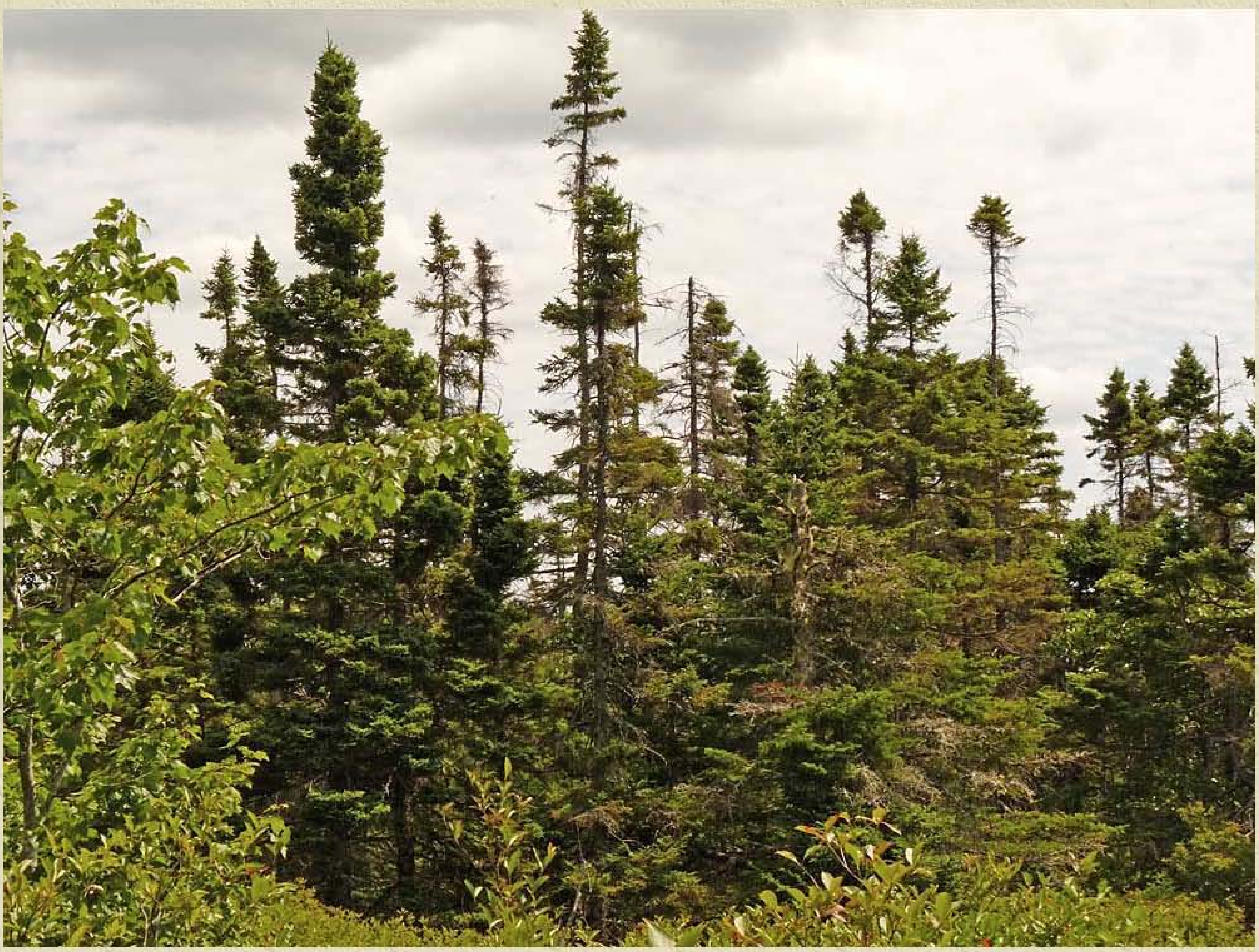


Low-lying black spruce stand

Here, black spruce exhibits its **signature profile** with a narrow, spire-like crown.

There is likely some **balsam fir** in the stand as well.

In the foreground red maple can be viewed at left and witherod at right, both typical of wettish ground that at this site drains into the lower-lying black spruce stand.



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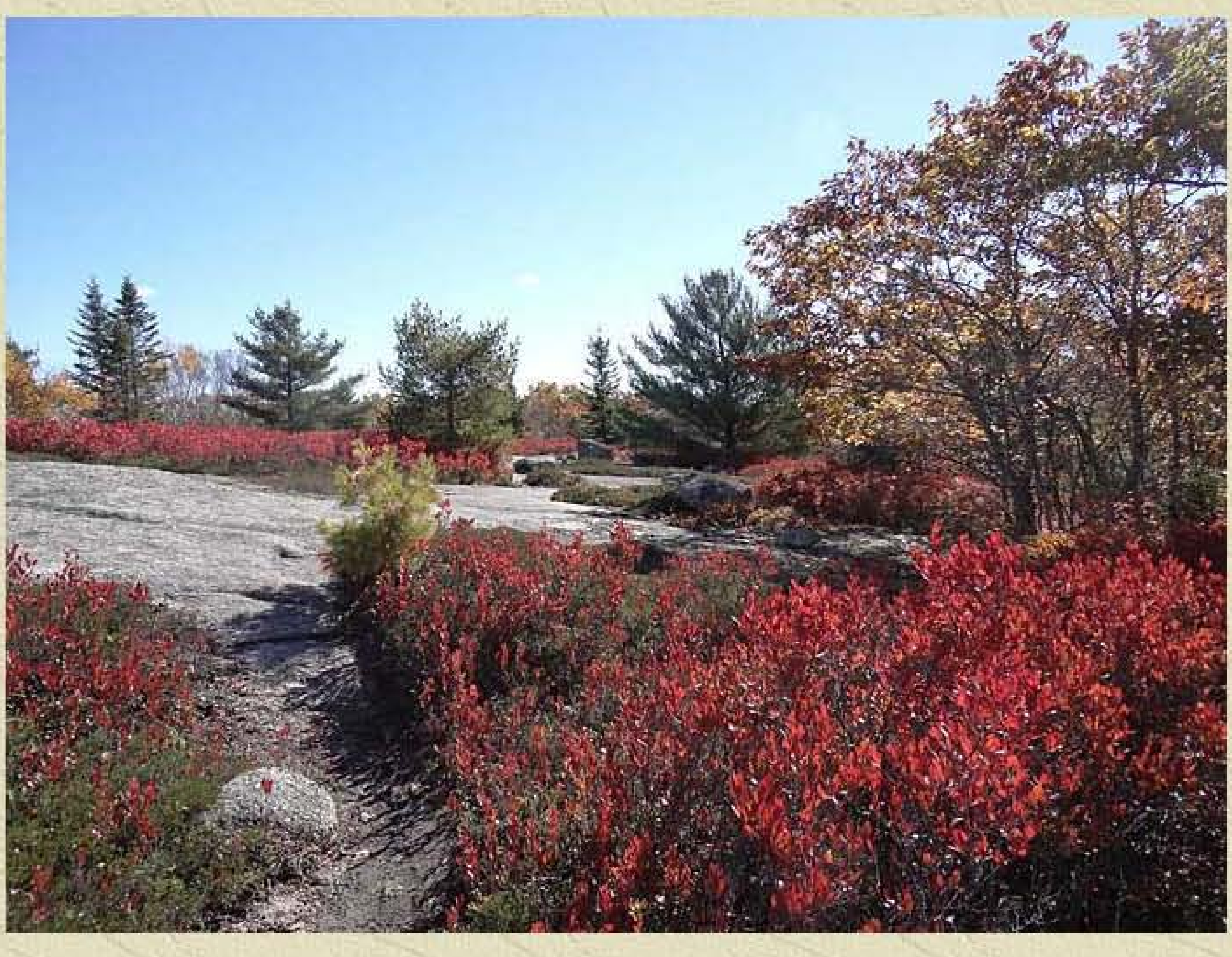
Landscapes of the Five Bridge Lakes Wilderness Area

Upland barrens/Pine/Oak woods

This photo, taken on October 24th, illustrates several features that stand out in Google Earth images taken in mid-fall:

- The bare barrens
- A fringe of red colured huckleberry
- Large white pines
- Oak woods at the right - note yellow leaves.

At this site, on The Bluff Trail, carpets of broom crowberry occur sandwiched between the bare rock and huckleberry. At undisturbed sites there is usually a lot of lichen growth on the exposed rock; it is lost in areas that are regularly trampled, as above.



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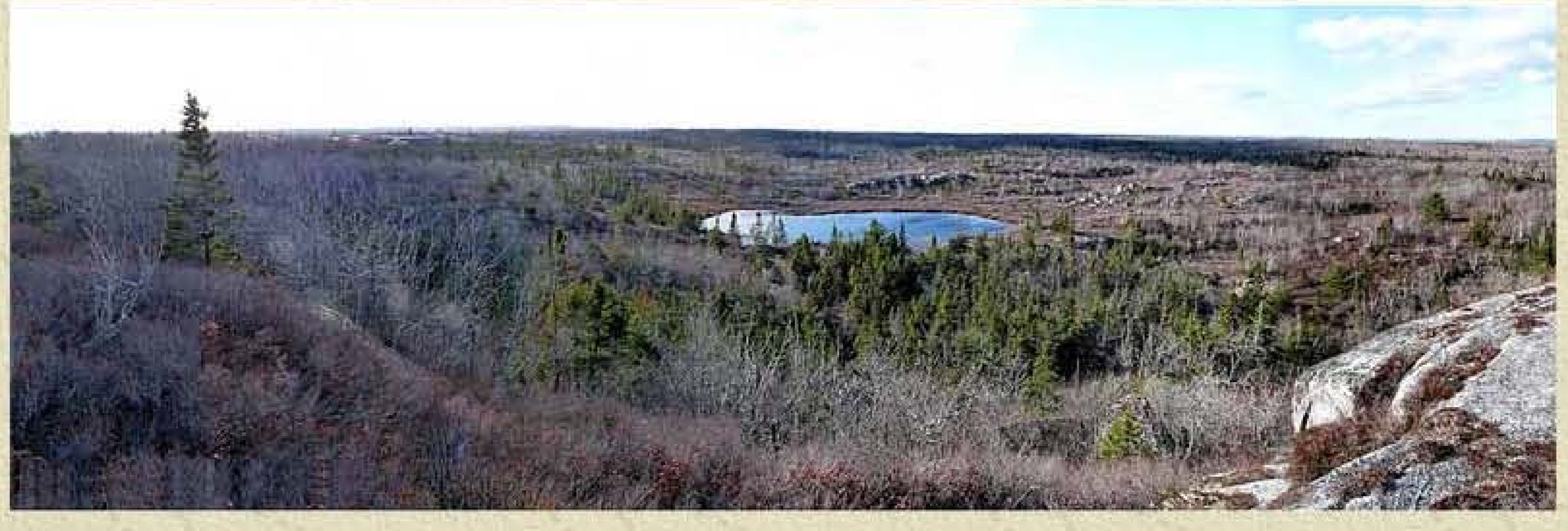
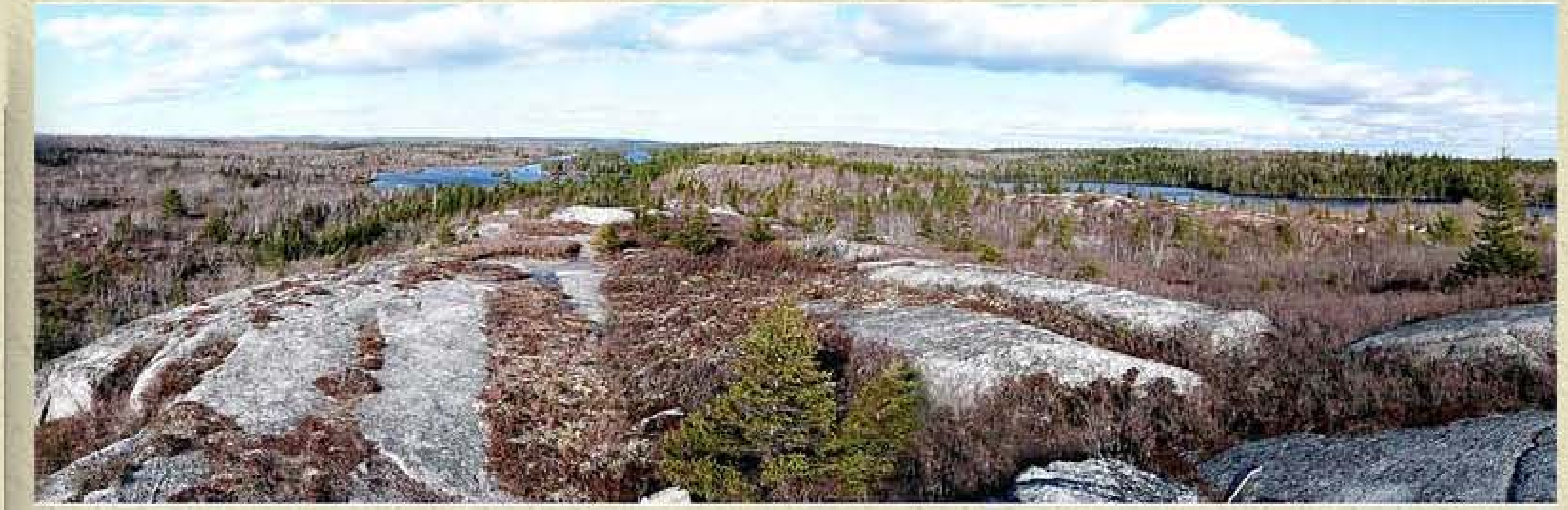
Panorama taken at south end of the Pot Lake loop on the Bluff Trail (Dec 2, 2009)
illustrates the mosaic landscape.



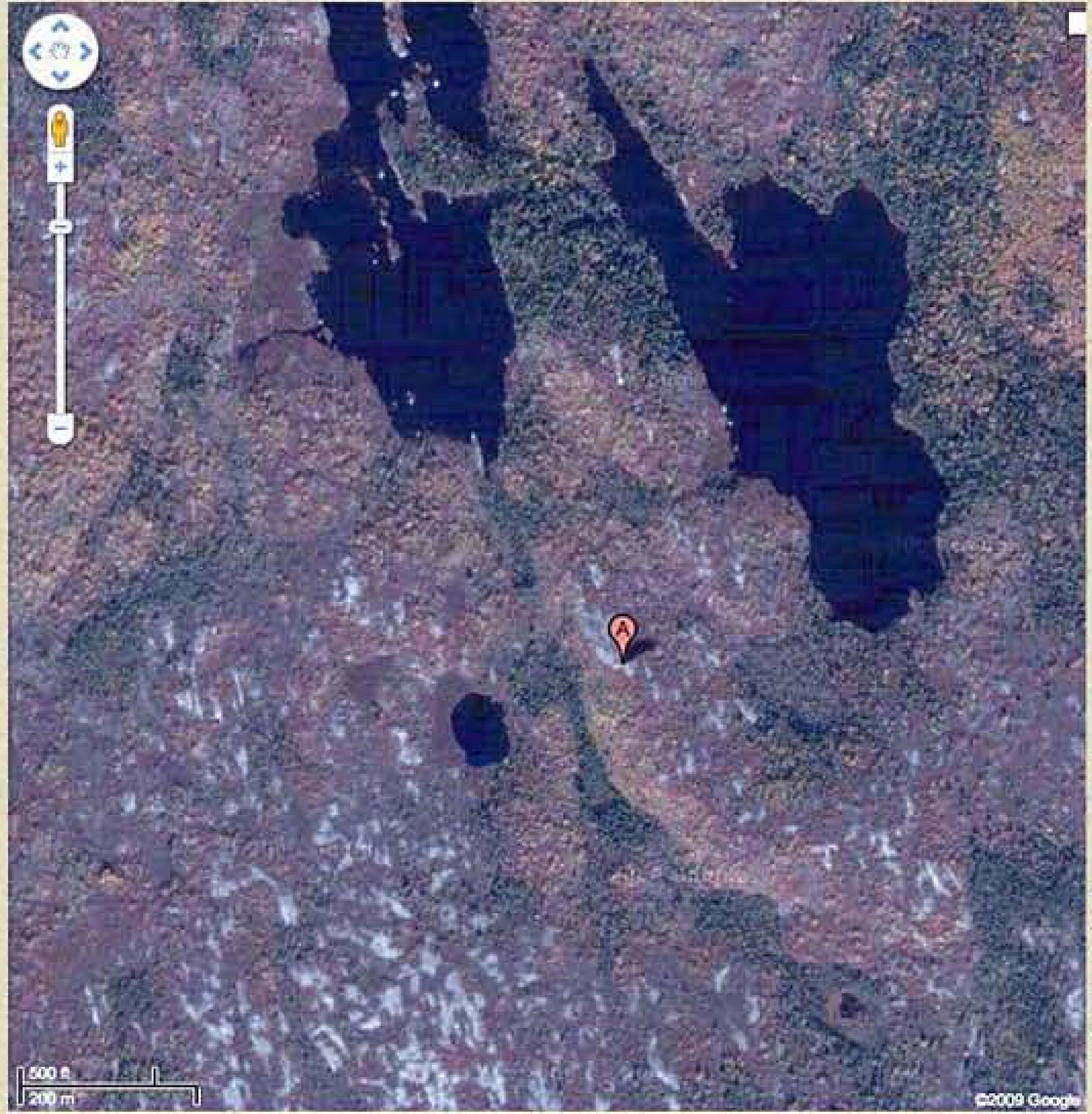


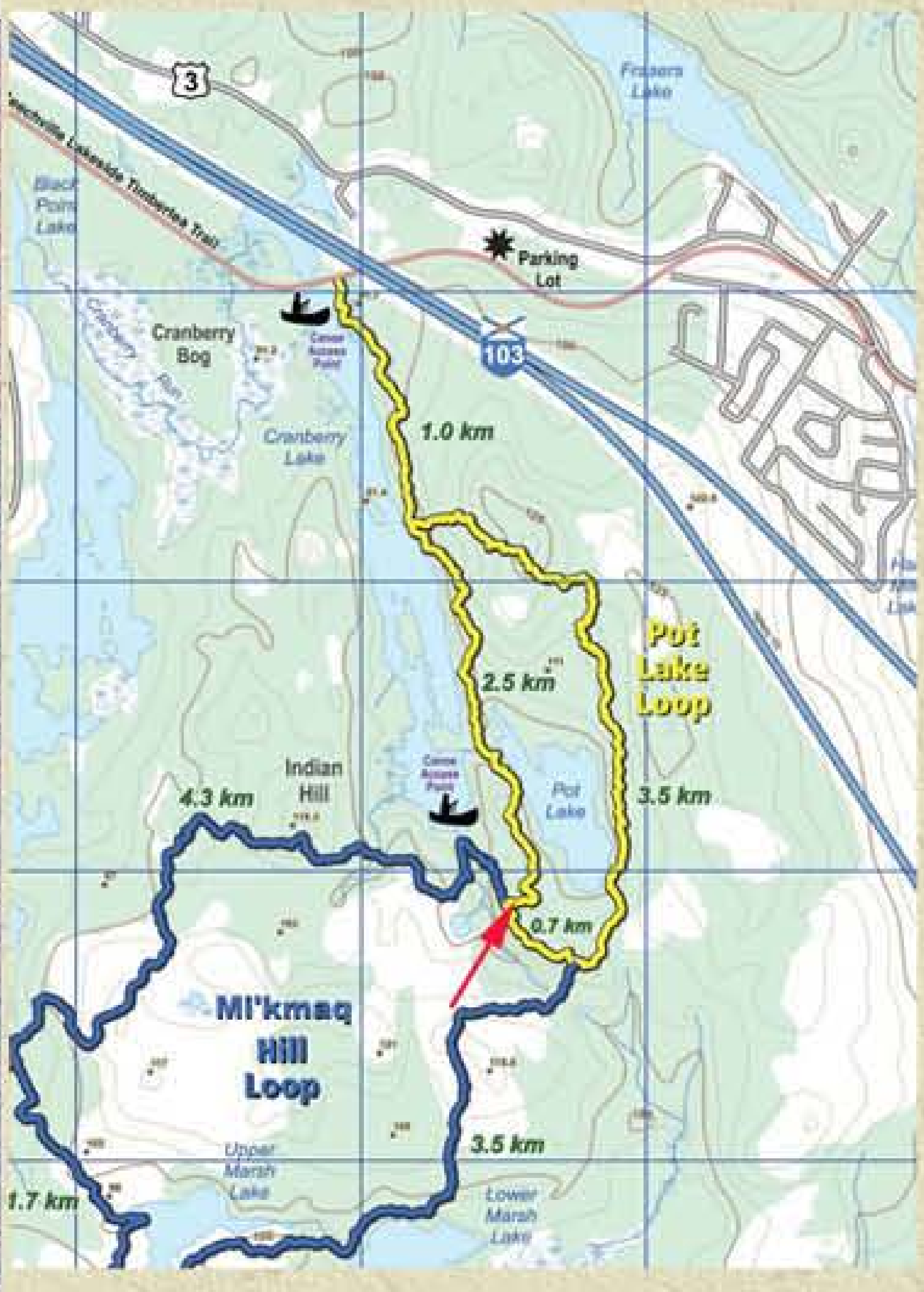
Top: View towards the west, a bog/pond. Note conifers, likely black spruce in low, wet lands; deciduous trees on upland to the left .

Middle: View towards the north. Rock outcrop with broom crowberry in foreground, Cranberry Lake to left, Pot Lake to right.

Bottom: View towards south east.

See Google image and map of The Bluff Trail at the bottom of the page.





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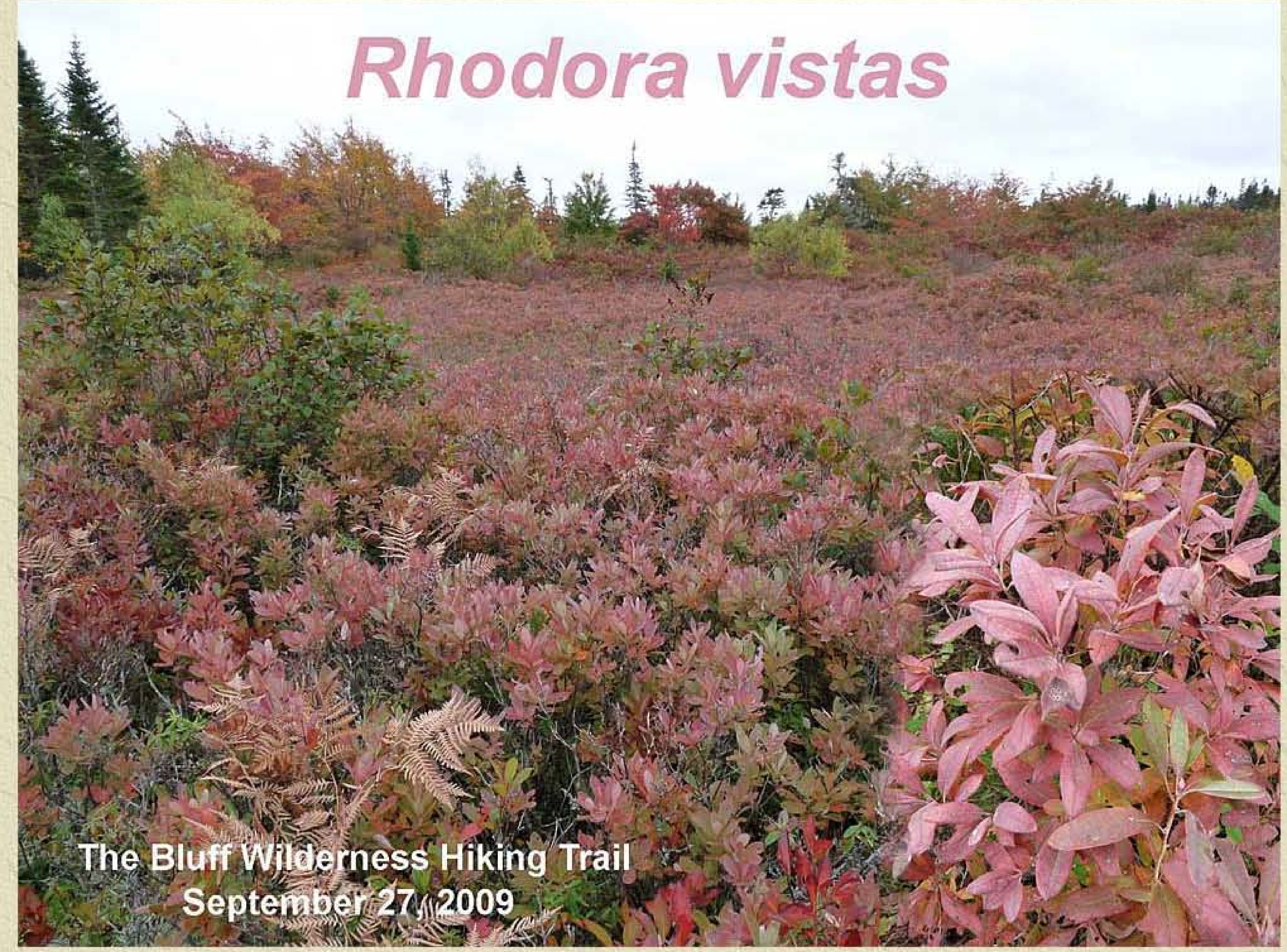
Leaves of our native azalea, Rhodora (*Rhododendron canadense*) were in its pastel pink stage.

It is seen in some years but not others.

It lasts for about a week.



Rhodora vistas

The Bluff Wilderness Hiking Trail
September 27, 2009

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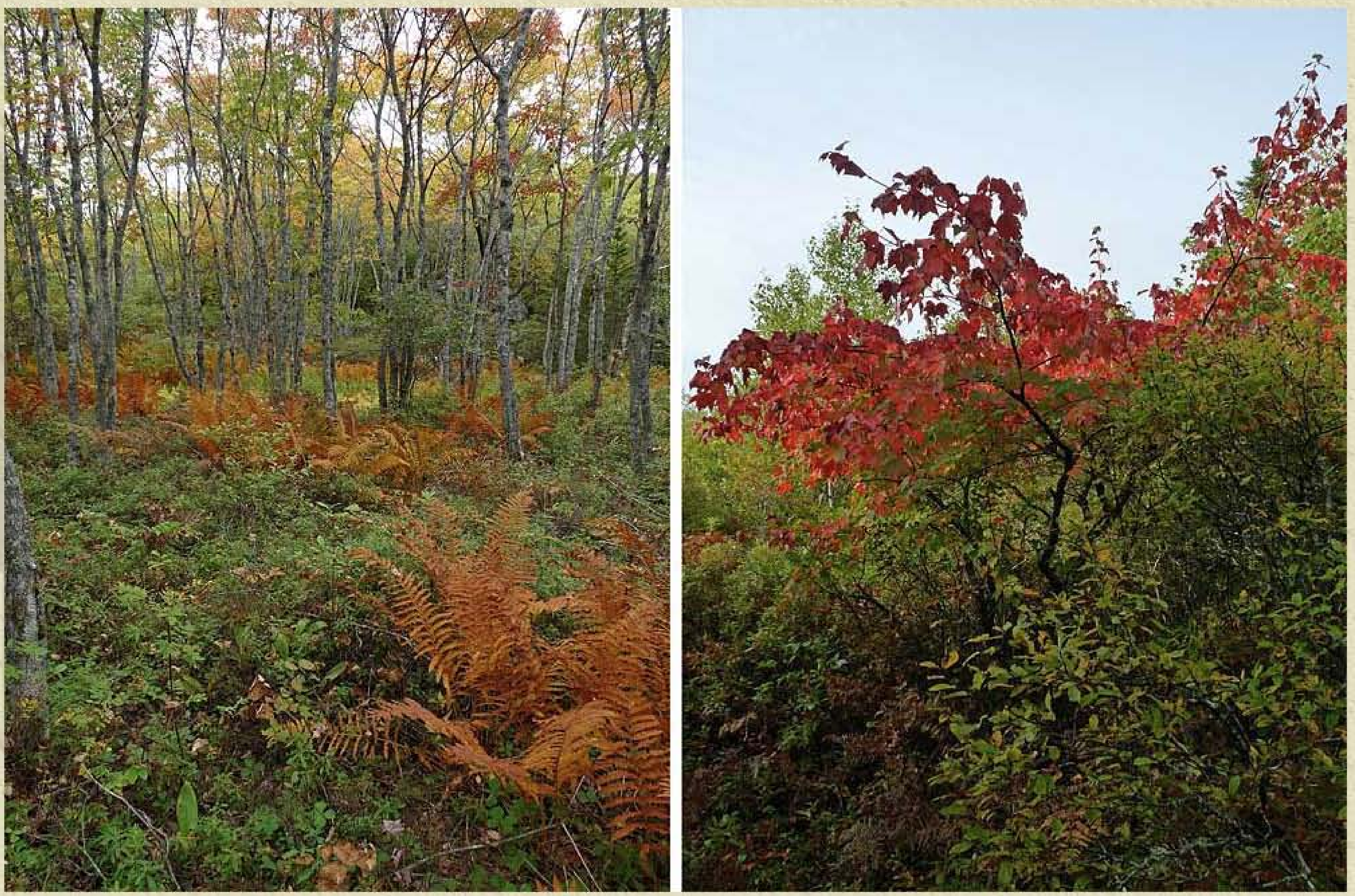
This photo and those in the next four pages were taken on the 4th loop of the Bluff Trail in late September, 2007.

Landscapes of the Five Bridge Lakes Wilderness Area

At left: Cinnamon ferns (*Osmundastrum cinnamomeum*) have turned cinnamon! (The common name however refers to cinnamon colured fibres that occur near the base of the fronds.)

Cinnamon fern is a wetland species, very common on this landscape. The trees are red maple.

At right, leaves on a red maple have turned red. It's usually the first deciduous tree to go into its fall colours - so that gives you an idea of when to look for Rhodoroa in its pastel pink stage.



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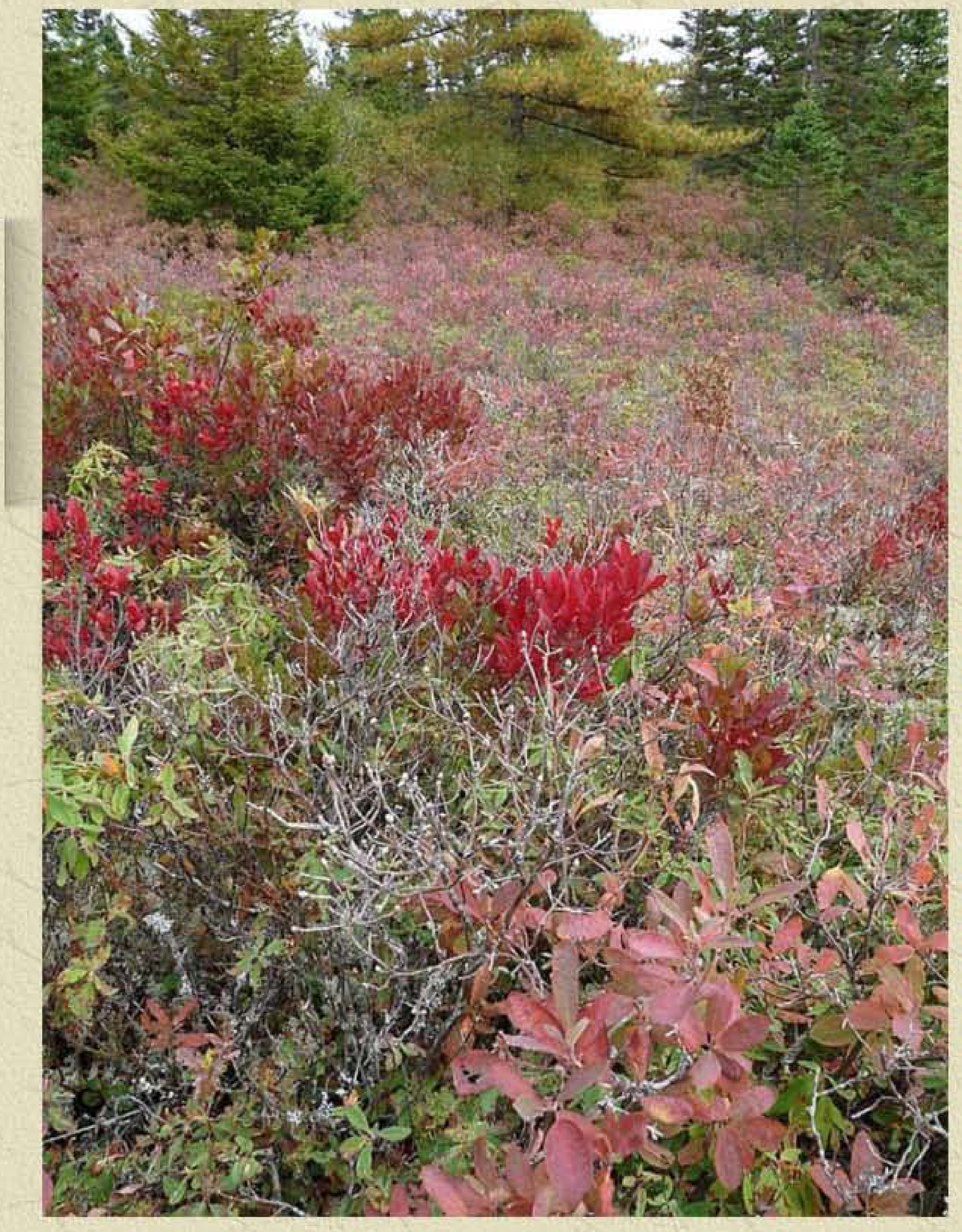
On the 4th loop of the Bluff Trail in late September 27, 2009, continued.

A splash of huckleberry red.

Huckleberry turns a fire engine red before its leaves finally drop.

This plant was a bit ahead of most of the huckleberry which turns after the leaves of most of the trees have dropped, circa mid-October.



On the 4th loop of the Bluff Trail in late September 27, 2009, continued.

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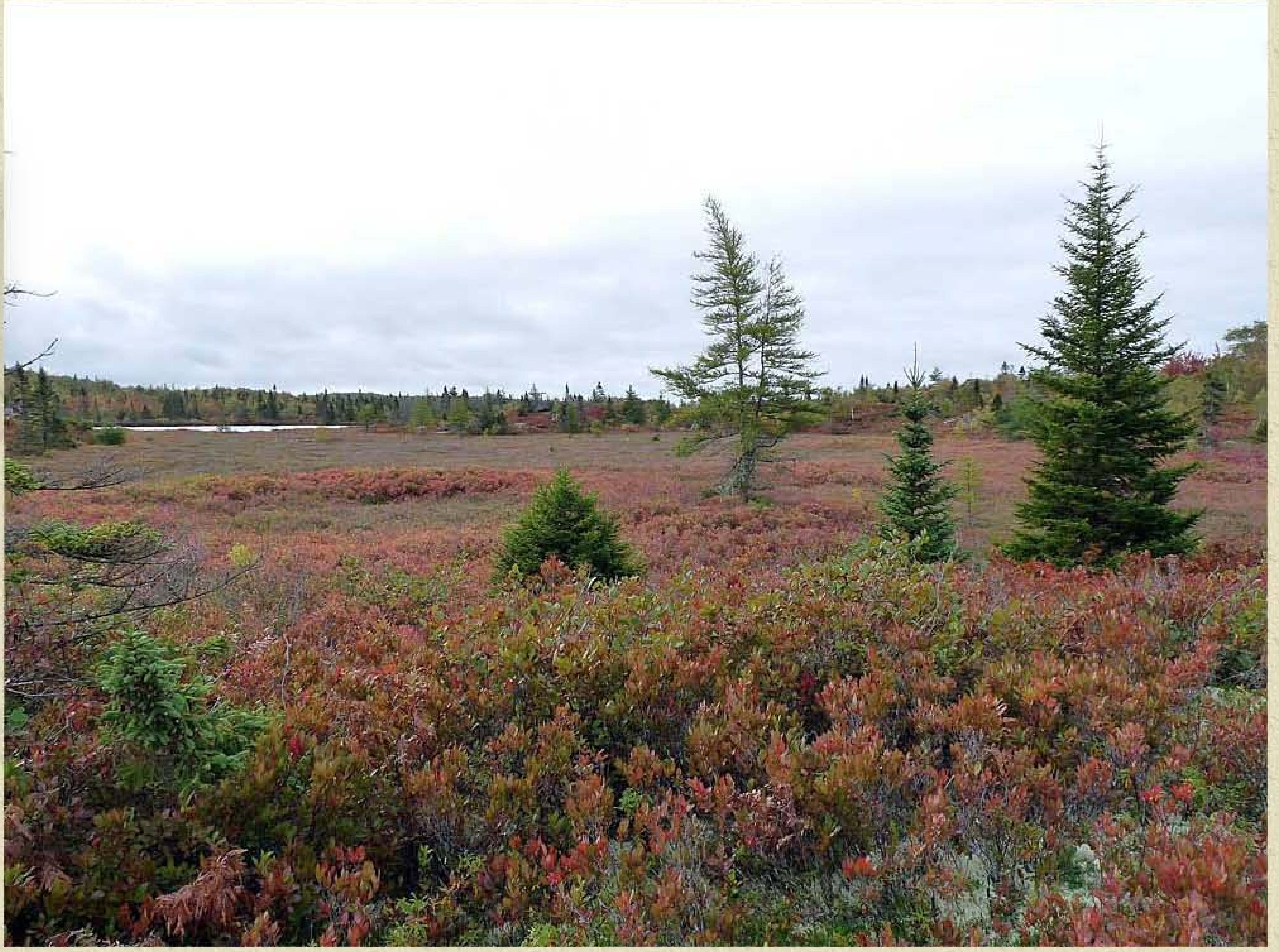
Overlooking a wetland by Upper Five Bridges Lake.

The pastel pink of Rhodora paints a large brush across the wetland.

In the foreground the bushes are mainly huckeberry, just beginning to turn towards the fire engine red seen in the previous photo.



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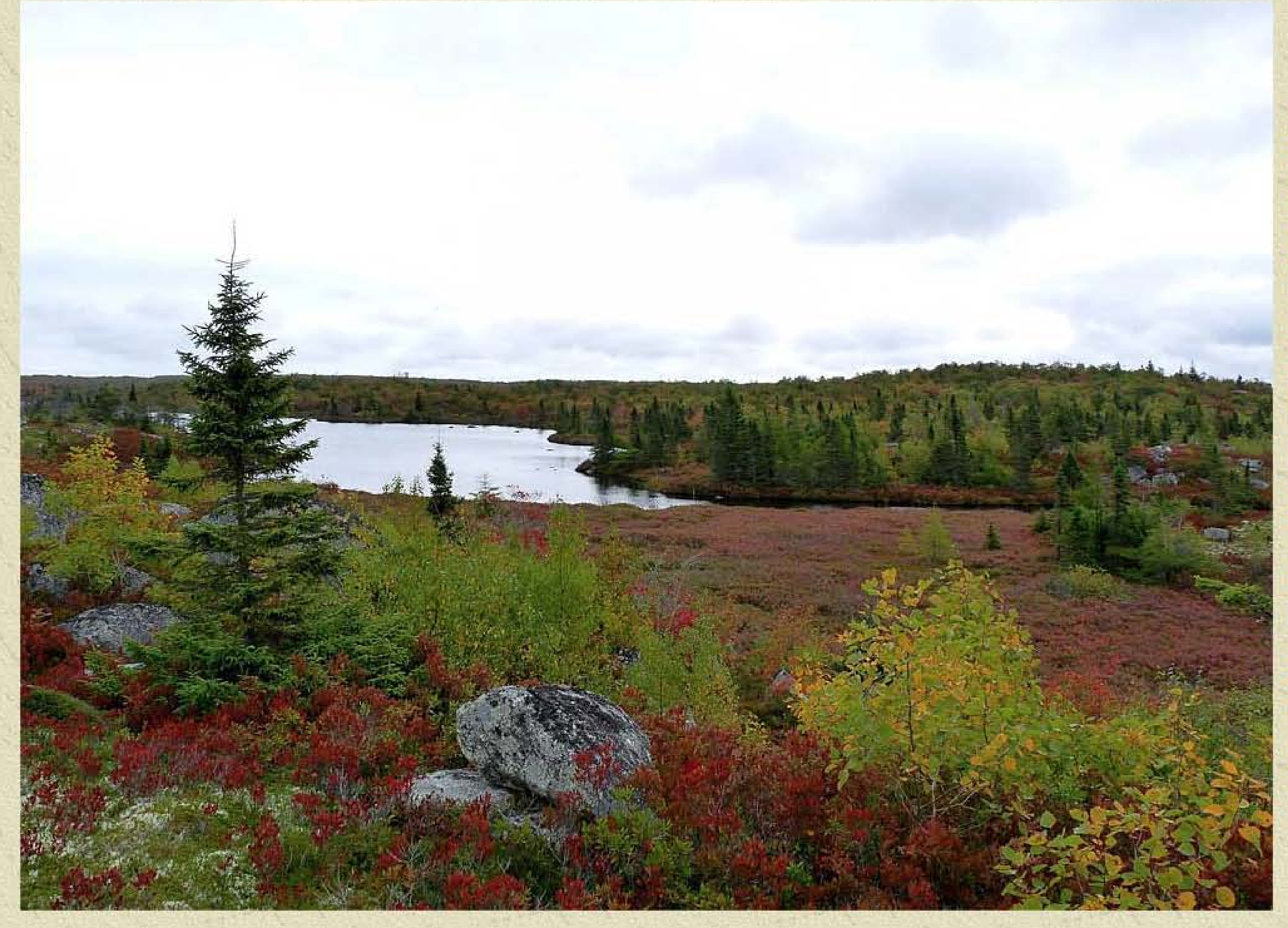
On the 4th loop of the Bluff Trail in late September 27, 2009, continued.

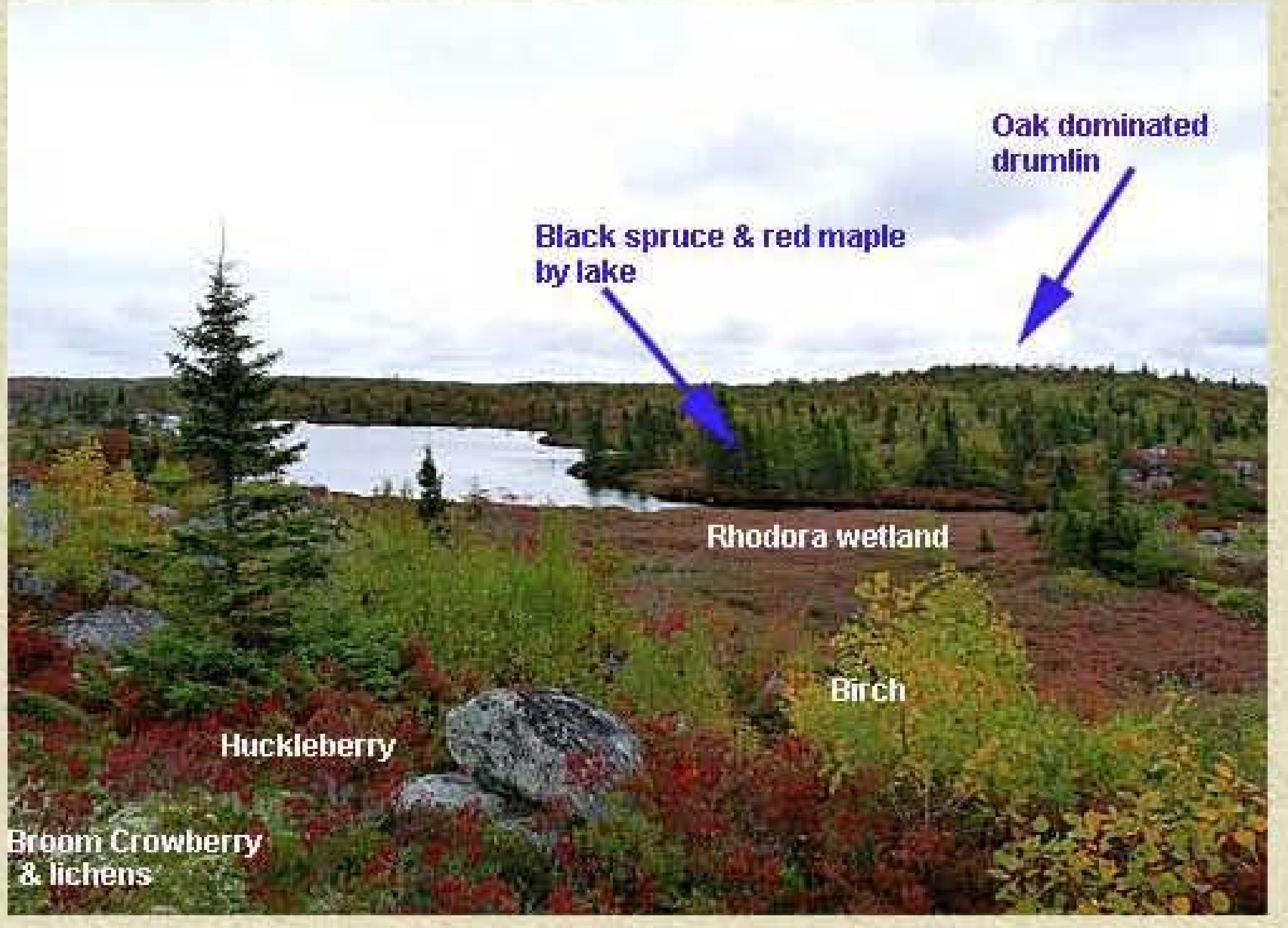
On the 4th loop of the Bluff Trail in late September 27, 2009, concluded.

Moasic landscape by Upper Five Bridges Lake.

An oak dominated drumlin at the top right; black spruce and red maple by the lake...and the Rhodora wetland.

In the foreground at left, rock barrens with broom crowberry, reindeer lichen; birch and some huckleberry (dark red).





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Perhaps no feature is more characteristic of this landscape than the drumlins that are seemingly spattered across it. The last pages explore a few of these drumlins.

The oak dominated drumlin below was viewed from the 4th loop of The Bluff Trail.

drumlin
Elongated, smooth hills of till, gravel and sand created by continental glaciers. The elongation is in the direction of ice flow. Many drumlins are steepest at the ends that face the direction from which the ice came and fall gradually to ground level at the other ends.[1]

This drumlin is dominated by red oak. They are likely about 50 years of age, dating back to the end of the period of recurrent, human-set fires[2].

1.Roberts, D.C. 1996. *A field guide to geology. Eastern North America*. Peterson Field Guide Series. Boston: Houghton Mifflin Co

2. A very large fire occurred on the Chebucto Peninsula in 1957. The last extensive fire on the Chebucto Peninsula occurred in the 1980s, after which malicious setting of fires declined sharply and fire control became more effective.

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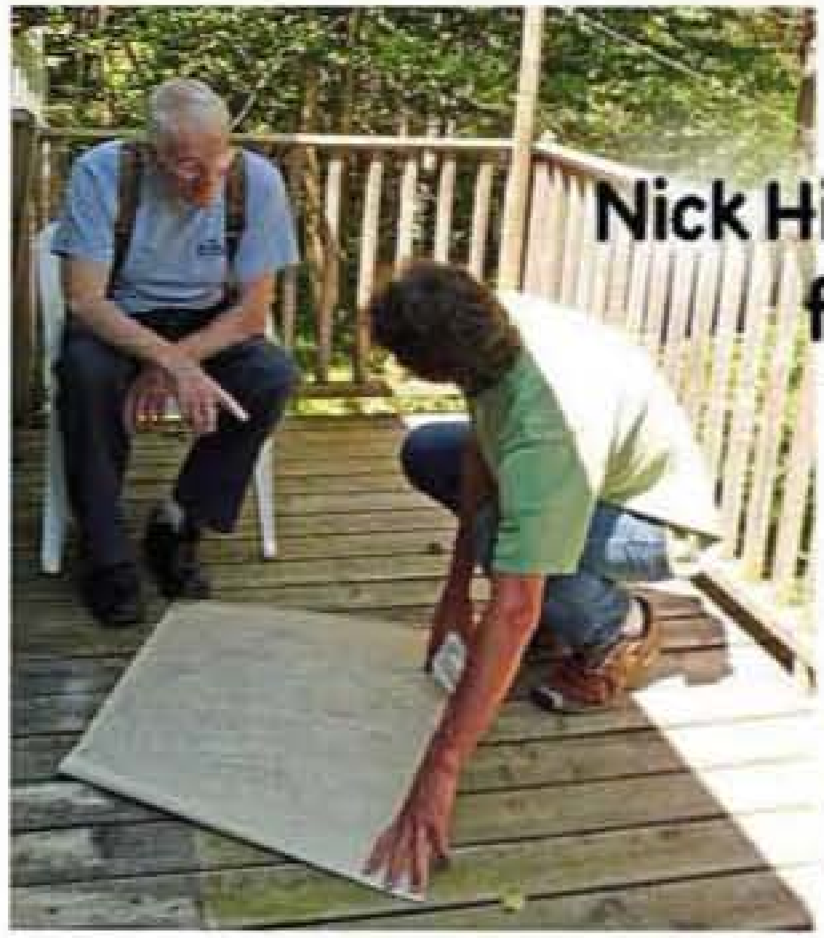
In the summer of 2009, Nick Hill and I followed up on comments made by Ralph Wheadon to Beth McGee that in his days as an employee and fire warden for NSDNR he had viewed "overmature" oak forest on a hill southeast of Oak Hill Lake, and very big red spruce on a hill east of Lower Trout Lake.

Ralph gave us very specific instructions on where to go. We weren't disappointed!

Old Growth on two drumlins south of the Old St. Margaret's Bay Road

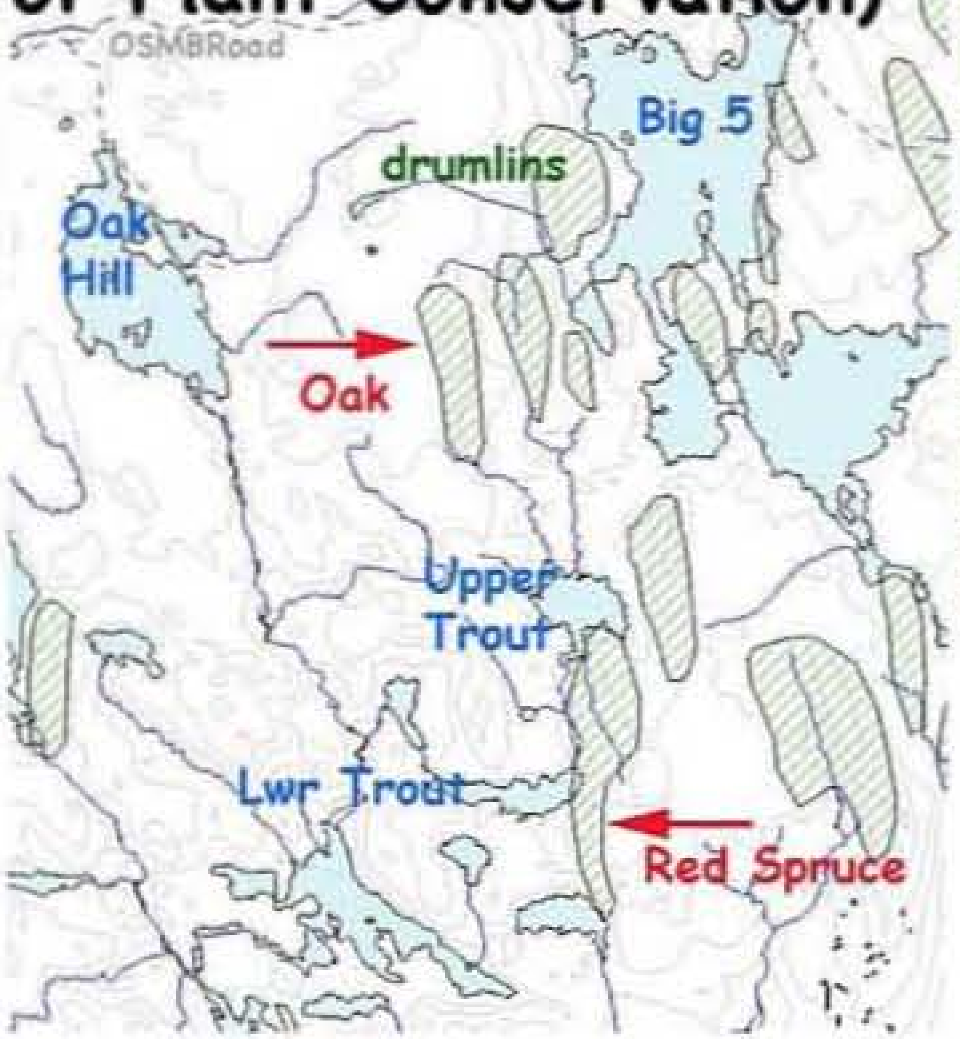
Beth McGee/Five Bridges Trust

Chebucto Wilderness Coalition Steering Committee



Ralph Wheadon x Index Map 56

Nick Hill (Fern Hill Institute for Plant Conservation)



David Patriquin

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The first site we explored was the drumlin southeast of Oak Hill Lake. It turned out to be a very special place.

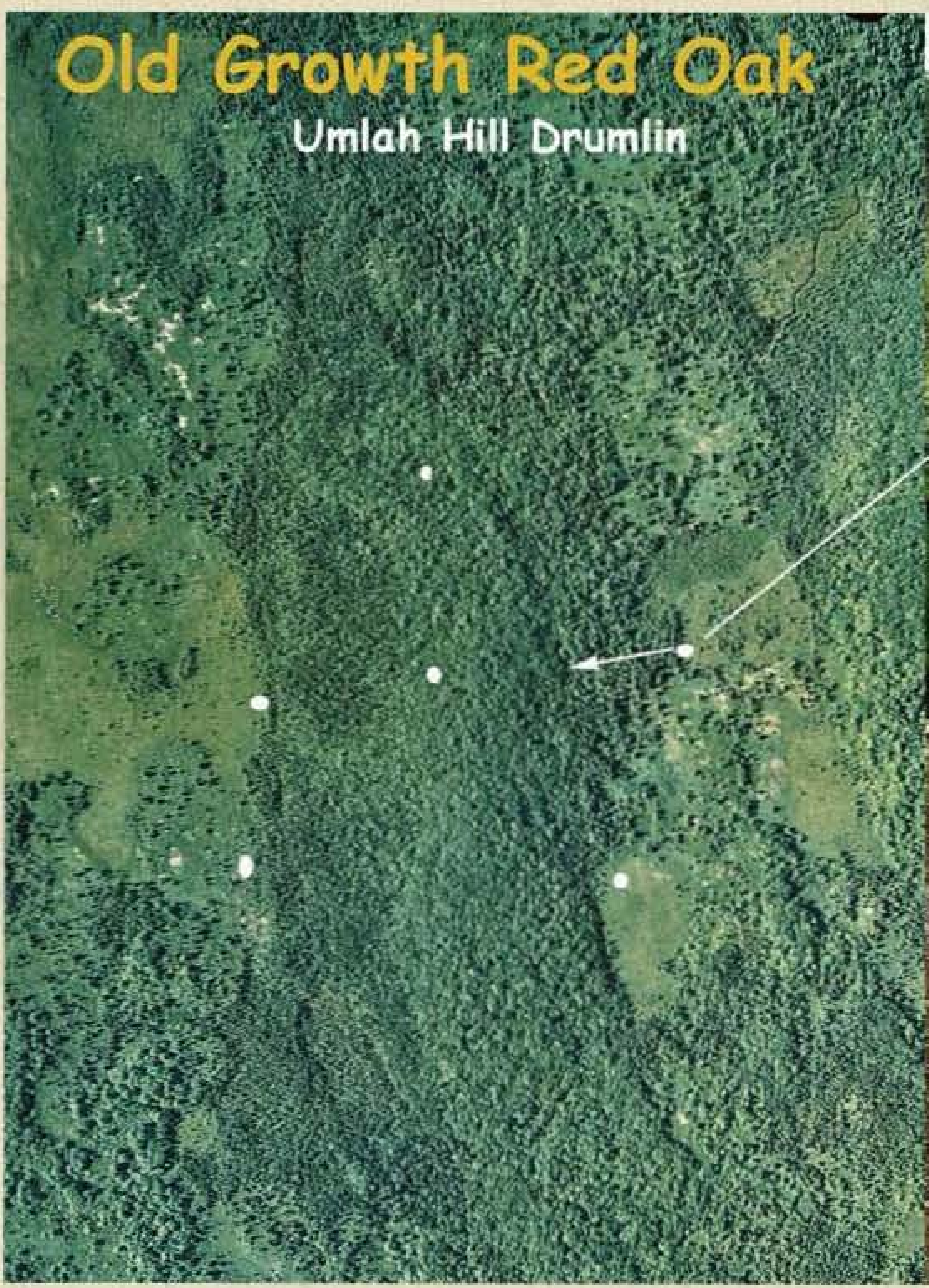
it is surrounded by wetlands. There is a fringe of black spruce as you approach the drumlin (top right), and then oak-dominated hardwoods.

The flowers is an orchid found in the wetlands. To the right of it is a large footprint, most likely that of the mainland moose.

Nick hugs a large oak - we found what had hoped to find!

Old Growth Red Oak

Umlah Hill Drumlin



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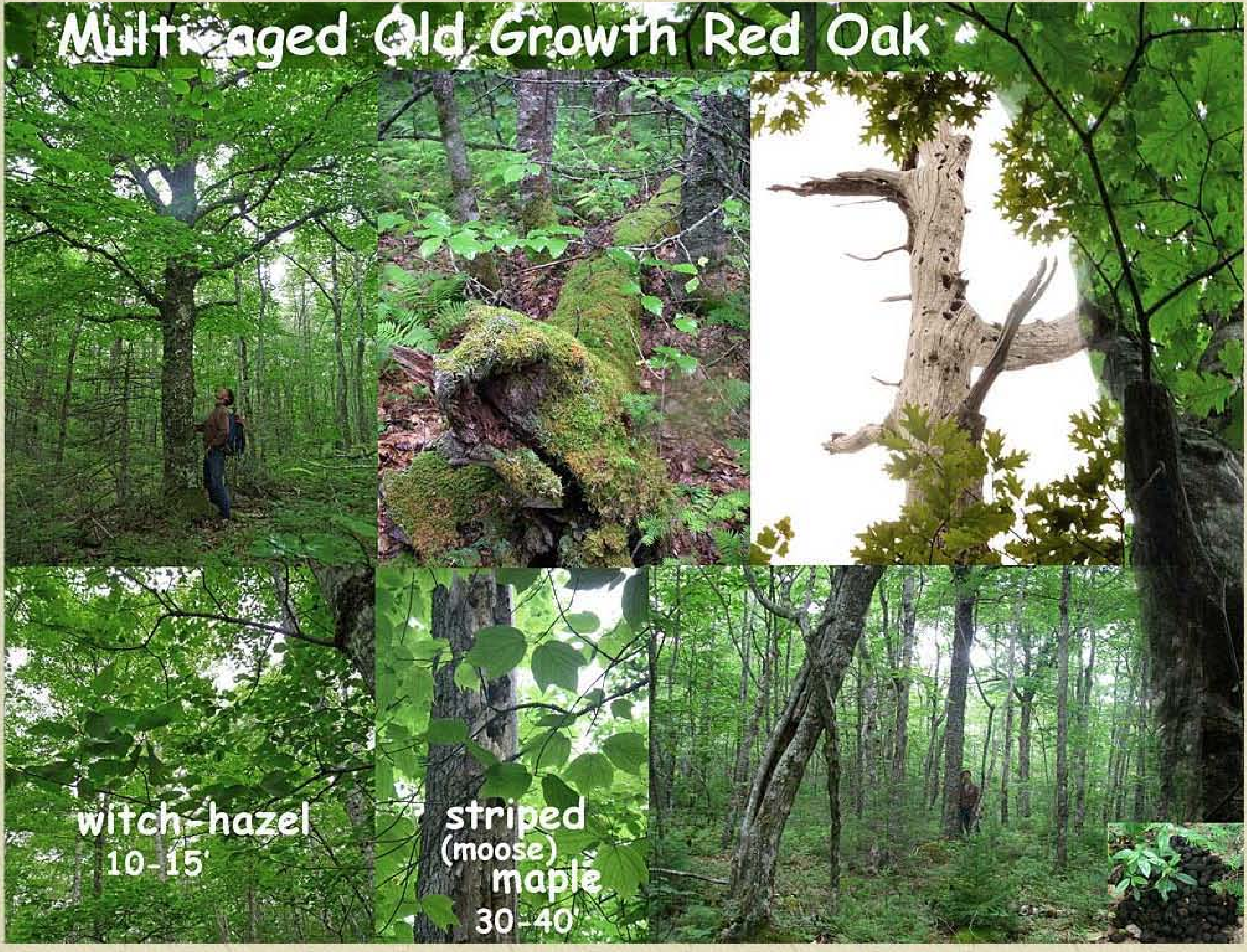
This is a highly unusual stand of red oak, exhibiting old growth features.

An abstract for a presentation on "**Multiaged old growth red oak stand on the Chebucto Peninsula**":

A Rapid Appraisal study was conducted July 21-22, 2009 to verify existence of and characterize an OG red oak stand on Umlah Hill southeast of Oak Hill Lake. It had been known years ago by Ralph Wheadon as a NSDNR employee and fire warden for the area. The site was visited again on Sep 3-4, 2011 to look for charcoal in soil profiles. The study was supported in part by Five Bridges Wilderness Heritage Trust.

The stand has features of a multiaged, old growth oak forest with snags and fallen dead in a range of diameters and distinct moose maple and witch hazel subcanopies. The overstory is made up mostly of red oak, some yellow birch, occasional white birch; red maple was common but tended to be in the subcanopy/overgrown by oak. The stand is estimated as about 15 ha in extent. Cores indicate the larger trees are over 100 years of age. We observed scat from mainland moose as well as evidence of the brown bear and many cavities in snags. Some adjacent areas support younger oak stands with some but not all of these features.

Soil profiles revealed charcoal layers in adjacent areas supporting younger oak stands, but not at Umlah Hill which appears to have escaped area fires by being relatively isolated and surrounded by wetland. Wind induced tree top damage continuously causes decay in the tallest oaks and these produce single tree light gaps and valuable habitat for a suite of snag-dependent wildlife. This mature forest is thus composed not of trees of several centuries old but of younger trees yet the forest has the same characteristics of typical OG. This type of old growth red oak forest is apparently now rare within the whole range of red oak in North America.



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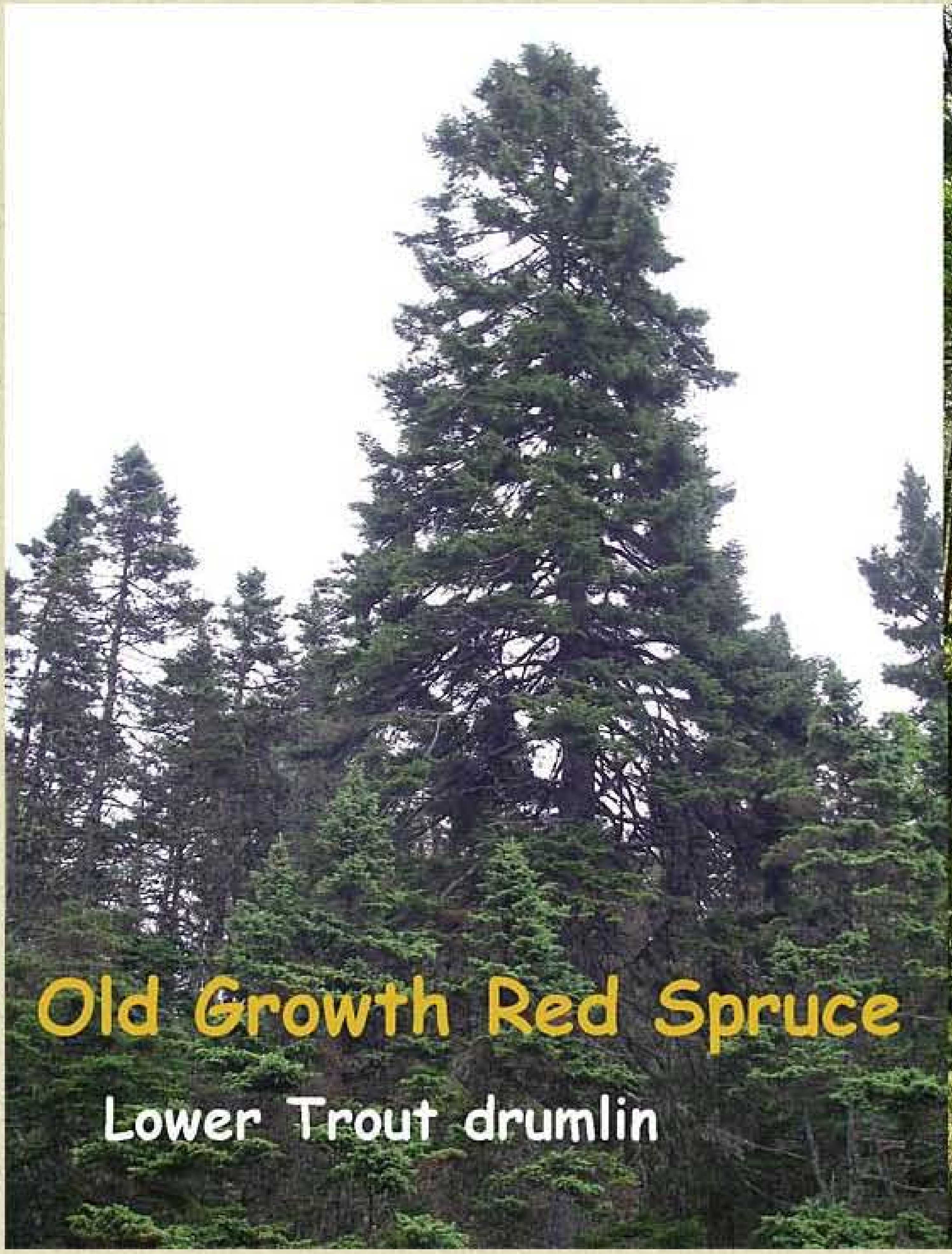
On the drumlin southeast of Lower Trout Lake, we found the large (old) red spruce Ralph had described. They exist largely as widely spaced individual trees in mixed forest or more densely in smallish groves over a total area of perhaps 50+ hectare.

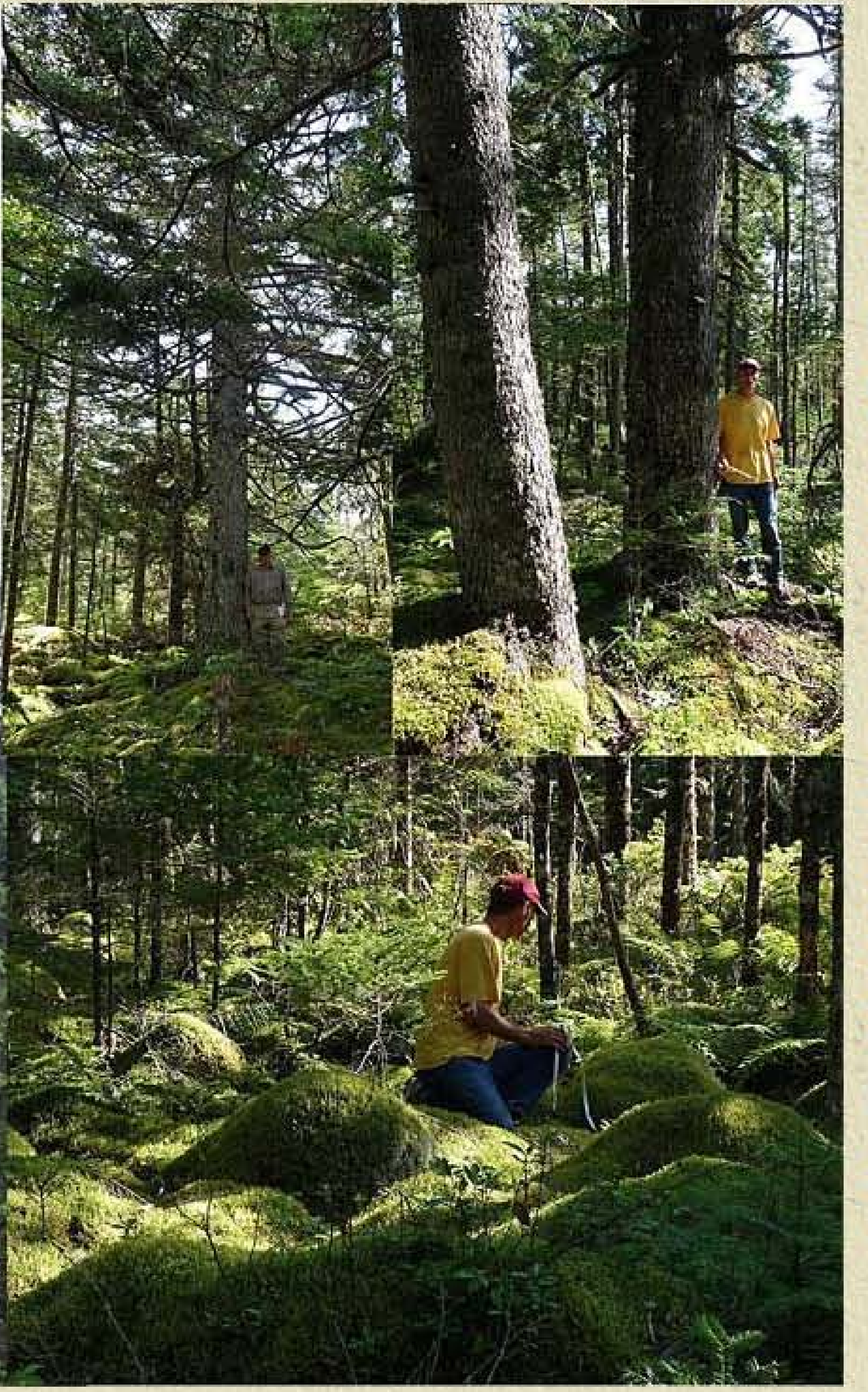
The trees tower above other species (fir, red maple, white birch, yellow birch, black spruce, pine).

The forest floor is bouldery and close to 100% moss and lichen covered with low vegetation (e.g., sarsaparilla, snowberry) where the canopy is mostly closed, and higher vegetation (typically 1 m, dominated by huckleberry, bracken fern, cinnamon fern) in more open areas.



Old Growth Red Spruce

Lower Trout drumlin



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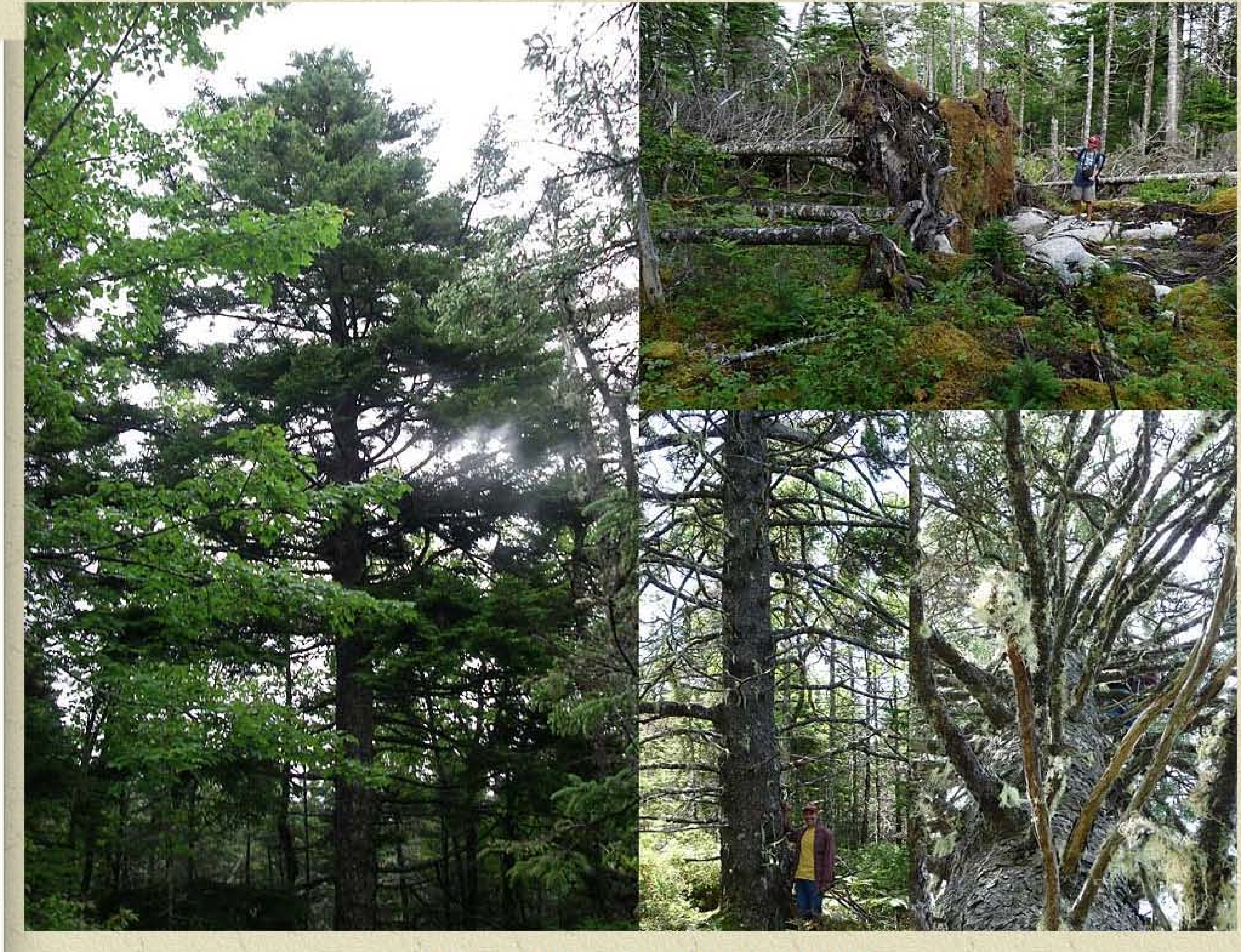
Many of the red spruce trees are in the range 0.50 to 0.84 m (20 to 33 inches) diameter at breast height. Such trees are large for Nova Scotia; Ralph Johnson in Forests of Nova Scotia (1986) commented: "Red spruce is a medium size tree at maturity, reaching 16 to 30 inches dbh and 70 to 90 feet in Nova Scotia at from 150 to 280 years of age. The largest red spruce reported in Nova Scotia was 31.8 inches dbh." Interestingly, our ground observations indicate the tallest trees can actually be identified on Google satellite maps from the shadows they cast on the surrounding trees. (Before we went into the area, we had wondered whether those shadows were cast by pines but, by far, the majority of the tallest trees are red spruce.)

The Lower Trout trees will need to be dated but from the appearance of the forest floor which has very few large downed rotting trees, we are guessing that these massive spruce trees were part of a regrowth of a secondary forest that replaced the primary forest after it was harvested 150 or more years ago. Individual red spruce trees can live for centuries and their progeny establish under the shading canopy and replace the large trees when they blow down. Today there are ample small red spruce for replacement of the large trees and over time, we expect that a true old growth forest with many snags, leaners and fallen dead trees in various stages of decomposition would develop, of course only in the absence of harvesting or fire.

A large blowdown was observed in an area where there are also many stumps and cut logs, suggesting that recent thinning may have contributed to the blowdown. Occasional large red spruce also occur outside of the Crown land in dense, fir forest which was likely clear-cut in the not-too-distant past.



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Nick climbed up one of the tall spruces, "The Climbing Tree" to get a panoramic view.

Photo on Aug. 12, 2009.

That's Lower Trout Lake in the distance.

Trees that tower above the rest are red spruce.

And wilderness as far os one can see.

Photo by Nick Hill

Photo by Nick Hill

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Landscapes of the Five Bridge Lakes Wilderness Area

The Five Bridge Lakes Wilderness Area
Oct 25th, 2011: It's Official!
So Much to Celebrate!
NOVA SCOTI
Trail Dedication
Woodens River Watershed Environmental Organization
did it!

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LANDSCAPES

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David G. Patriquin
April 15, 2011